June
1931

AMERICAN GAS ASSOCIATION MONTHLY

A. G. A. Adopts New Five-Year Program

Complete Testing Starts at Pacific Coast Laboratory
F. R. WRIGHT

Technical and Practical Requirements of Modern Forge Furnaces
WM. LEHRER and A. B. BARBER

Natural Gas Men Hear of Industry's Progress
KEITH CLEVENGER

Bringing the University To the Student In the Gas Plant

A. G. A. Issues New Specifications For Gas Appliances

Eight Receive McCarter Medals for Life Saving

Statistics—Their Function and Development in the Gas Appliance Industry
PAUL RYAN

Sales Administration and Management In the Gas Industry

—A Study Course for Sales Executives and Supervisors

THIS course of study is based upon a comprehensive survey of the Gas Industry. It brings to chief sales executives and supervisors detailed information about the plans and methods that *are increasing sales* and *decreasing selling costs* in other gas companies. SALES ADMINISTRATION AND MANAGEMENT summarizes the experience of the industry in laying out sales policies and managing the sales force.

ENROLLMENT: $50

For Further Information Address

COMMERCIAL SECTION

AMERICAN GAS ASSOCIATION

420 Lexington Avenue New York, N. Y.

AMERICAN GAS ASSOCIATION MONTHLY

Allyn B. Tunis, Editor

Advisory Committee

FRANK LEROY BLANCHARD — E. FRANK GARDINER — F. HARVEY HOLDEN
EDWARD F. MCKAY — CHARLES E. WETZEL — HOWARD F. WEEKS

VOLUME XIII — JUNE, 1931 — NUMBER 6

CONTENTS

	PAGE
Our Own Who's Who—Fred A. Miller	238
A. G. A. Adopts New Five-Year Program	239
Complete Testing Starts at Pacific Coast Laboratory F. R. WRIGHT	244
New England Gas Exhibit Scores Success A. M. SLATTERY	246
Eight Receive McCarter Medals for Life-Saving	247
Statistics—Their Function and Development in the Gas Appliance Industry PAUL RYAN	248
Technical and Practical Requirements of Modern Forge Furnaces WILLIAM LEHRER and A. B. BARBER	250
Bringing the University to the Student In the Gas Plant	254
Affiliated Association Activities	256
Convention Calendar	257
Natural Gas Men Hear of Industry's Progress KEITH CLEVENGER	260
Personal and Otherwise	265
A. G. A. Issues New Specifications for Gas Appliances	266
Brooklyn to Try-Out Progressive Dealer Cooperation Plan HUGH H. CUTHRELL	267
More Than 300 Attend Conference H. W. HARTMAN	268
Producer Gas Committee Meets	270
Equilibrium in the Iron-Oxygen-Hydrogen System at Temperatures Above 1000° C. WALTER E. JOMINY and DONALD W. MURPHY	273
What Home Service Workers Should Know About Hot Water Service J. G. AMES	276
Supplement to the Bibliography on Change-Overs from Manufactured to Natural Gas LUIS HILT	279
New Members Join Association	280
Gas Appliance and Equipment Developments	281
Monthly Summary of Gas Company Statistics PAUL RYAN	282

The Association does not hold itself responsible for statements and opinions contained in papers and discussions appearing herein.

Published Monthly by the

AMERICAN GAS ASSOCIATION

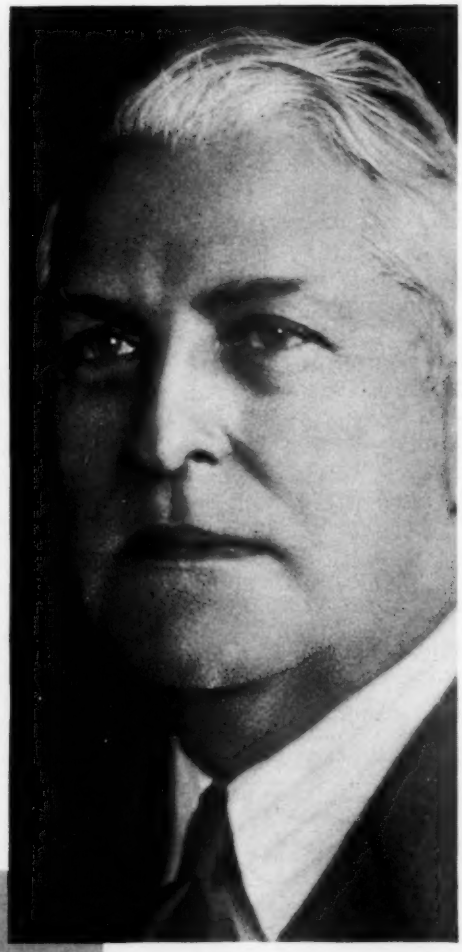
Publication Office, American Building, Brattleboro, Vt.
Editorial Offices, 420 Lexington Ave., New York, N. Y.

Entered as Second Class Matter at the Post Office at Brattleboro, Vermont, February 10th, 1922, under the Act of March 3, 1879.

Subscription Rate . . . . . $3.00 a Year

OUR OWN WHO'S WHO

LXXIII



Fred A. Miller

FRED A. MILLER, chairman of the board of the S. R. Dresser Manufacturing Company, Bradford, Pa., is a well-known figure in the gas industry. Mr. Miller is 62 years of age, and began his business career in the lumber industry, remaining in that occupation for seventeen years, or until January 1, 1903, when he took up the management of the business of S. R. Dresser. In 1905, when the business was incorporated, Mr. Miller was elected treasurer and general manager, which position he held until Mr. Dresser's death, in 1911. He then was elected president and general manager, serving in that capacity until 1929, when he was named chairman of the board and member of the Executive Committee. Mr. Miller served for a long time as president of the Natural Gas Supply Men's Association, and has been a director of the American Gas Association since October, 1929. He enjoys a wide acquaintanceship throughout the industry, due to his long and close business relationship with men engaged in the natural gas and oil business. Mr. Miller is a lover of dogs, and is rarely absent from hunting and field trials. Apart from his interest in the gas industry, Mr. Miller has been for twenty years a director of the Bradford National Bank.

AMERICAN
GAS ASSOCIATION
MONTHLY

VOLUME XIII | JUNE, 1931 | NUMBER 6

A. G. A. Adopts New Five-Year Program

IMPRESSED with the soundness and satisfactory operation of the policies and principles set forth in the Five-Year Program, adopted by the American Gas Association in 1926, a new program, based largely on the same fundamental principles, submitted by the Committee on Association Activities, was adopted by the Executive Board at a meeting held in Atlantic City last month. This means that the Association will continue work along the same comprehensive lines laid down in 1926 by the Committee headed by the Hon. George B. Cortelyou, president of the Consolidated Gas Company of New York.

D. D. Barnum, present chairman of the Committee, in submitting his report to the Board, asserted the belief of the committee that a continuance of a uniform policy was important, not only at this time but for a long while to come.

Analyzing the operation of the Association, the committee found that there should be a continuance of the policy that the Association should not extend the scope of its work beyond those objects which are of first importance and greatest practical value to the gas industry. It was pointed out that if the Association's activities are broadened beyond the scope of practical accomplishment, its influence would be weakened.

The report had the unanimous approval of the Committee, composed of the following members:

D. D. Barnum, Chairman, Boston Consolidated Gas Co., Boston, Mass.

C. E. Paige, The Brooklyn Union Gas Co., Brooklyn, N. Y.

H. C. Abell, New Orleans Public Service Inc., New Orleans, La.

Howard Bruce, Bartlett Hayward Co., Baltimore, Md.

H. C. Cooper, Hope Natural Gas Co., Pittsburgh, Pa.

Addison B. Day, Los Angeles Gas & Electric Corp., Los Angeles, Calif.

L. B. Denning, Lone Star Gas Co., Dallas, Texas.

E. S. Dickey, Maryland Meter Works, Baltimore Md.

O. H. Fogg, Consolidated Gas Co. of N. Y., New York, N. Y.

Samuel Insull, Jr., Midland United Co., Chicago, Ill.

Copy of the report as approved by the Executive Board follows:

"Your Com-

High Spots In Five-Year Plan

THAT intensive efforts be made to secure cooperation within the gas industry and with all practicable enterprises and activities outside of the industry, to improve selling methods, to stimulate selling efforts, to enlarge understanding and appreciation of gas service with special emphasis upon water heating, house heating, refrigeration and house cooling as additions to the domestic load.

That the industry's efforts to promote the increased use of gas service be of the broadest scope and be made to embrace sincere and mutually profitable cooperative relations with dealers, craftsmen and other related trades.

That our educational efforts be continued, both in and out of the industry, having in view the application of proper rate structures and proper bases for valuation of property used in the public service.

That technical research in all fields affecting the gas industry be carefully correlated and actively prosecuted.

That every effort be made to further secure public and dealer recognition of Laboratory approved appliances and to discourage the use of equipment which is not suitable for public use.

That the Association continue and enlarge upon its program of assembling, so far as possible, through the aid of local gas companies, in cities where conventions are held, displays of domestic, commercial and industrial gas appliances, to be exhibited at such conventions.

That the Association through a special committee which has been appointed re-consider the subject of national advertising, which should if embarked upon, be fully tied in with local gas companies which are the most important factors in such an undertaking, and should be adequately financed over a sufficient number of years to insure its success.

That the current educational work be carried on; and that the Association continue its support of courses in gas engineering and complete the sales and contact courses of gas company employees.

That the statistical work of the Association be limited to the practical needs of the industry.

That the declaration of the Program of 1926 be repeated, that the Association should pay for its various undertakings, out of its resources, secured through dues or other direct subscriptions to its treasury, in preference to special assessments.

That there be continued adherence to the policy that the Association shall not extend its work beyond those objects which are of first importance and greatest practical value to the industry, it being obvious that if its activities become broadened beyond the scope of practical accomplishment, its influence will inevitably be weakened.

D. D. Barnum, Chairman

H. C. Abell

H. C. Cooper

E. S. Dickey

L. B. Denning

Committee on Association Activities

mittee appointed by the President with the approval of the Board to present a program of Association activities to follow the Five-Year Program adopted in 1926, having held many meetings and conducted widespread discussions and correspondence, begs leave to present for your consideration the following report:

"Your Committee of 1931 is profoundly impressed with the soundness and comprehensive scope of the report of 1926, the Committee of which Mr. Cortelyou was Chairman, and believes the policies and principles set forth are good for all time, and can with few changes be repeated at this time for another Five-Year Program.

"In addition to the main report of the Committee, the President requested the Committee to analyze the operation of the Association with the object of determining if greater efficiency and economy might be obtained in the activities of the Sections, and the Association as a whole. It was felt that we should, if possible, either obtain the same beneficial net result from our activities for less money, or we should accomplish greater benefit for the same total cost to the industry.

Program of American Gas Association Activities

"As in the program of 1926, the basis of any program of Association activities must be the objects of the organization, set forth as follows in Article II of the Constitution:

"*Section 1.* To promote and develop the gas industry and to co-ordinate its activities to the end that it may serve to the fullest possible extent the best interest of the public.

"*Section 2.* To increase the effectiveness of gas service for light, heat and power for the mutual benefit of the producers and the users.

"*Section 3.* To advance to the highest efficiency the methods of manufacture, distribution, utilization, sales and accounting employed in the gas industry and to collect, co-ordinate and disseminate ideas and information for this purpose.

"*Section 4.* To conserve and encourage investment in the gas industry.

"*Section 5.* To promote closer relations and cordial cooperation in all branches of the gas industry.

"*Section 6.* To advance knowledge and learning in the sciences, and to stimulate invention and research, especially as applied to the gas industry.

"*Section 7.* To cooperate with other organizations in efforts toward economic advancement, accident prevention, conservation, standardization and other activities.

"*Section 8.* To provide methods of education for employees in the gas industry and generally to increase individual efficiency.

"A comprehensive review of the work of the Association confirms the statement of the 1926 Committee: "'A careful survey of the Association's present activities, as set forth in the budget and in studies that have been made therefrom, makes it plain that all of them are in strict conformity with the purposes of this organization. Whether they all bear the proper relation to each other is a matter for individual opinion. It must be borne in mind at all times that probably no two individual members of the Association will be able entirely to agree upon the actual relative importance of all of our undertakings, and our action must depend upon the best thought of the industry with all elements duly represented.

"'While all projects undertaken by the Association have been duly authorized by the Executive Board, it is well that we should from time to time, stop and take stock of our activities for the purpose of determining if the Association is carrying out its purposes in conformity with the Constitution.'

"The Association has proved itself of inestimable value during the past fourteen years and will be even more so in the future. It is a necessary factor in the life of the industry.

"Our industry has shown notable progress during the five-year period. Our sales of manufactured gas have increased from 466 billion cubic feet to approximately 524 billion cubic feet, and our gross earnings have advanced from $500,000,000 to approximately $542,000,000. Even in a period of disturbed business conditions the manufactured gas industry has shown significant stability and has more than even demonstrated its essentiality to our people.

"During the five years we have consolidated with the Natural Gas Association of America. This branch of our industry is of rapidly increas-

ing importance. Due to discoveries and accelerated production this growth has been very rapid, both in sales to the utility industry and for other purposes. While natural gas sales decrease in times of industrial quiet to a greater extent than do manufactured gas sales, there will be a further expansion in this field in the immediate future.

"The development of the field of industrial gas for house and other building heating and for water heating offers our greatest opportunity for the expansion of our business. Recently our field has been enlarged to include refrigeration, cooling of buildings and air conditioning, with bright prospects for a substantial increase in load in this new field in the not distant future.

"There is growing competition with other fuels in the domestic field. Our statistics indicate that this side of our business, except for lighting, has more than held its own. The domestic load is the backlog of our business, and every effort should be made to increase the sales in this field; and to render such service therewith as will strengthen the position of gas and gas service as pre-eminently the ideal domestic fuel.

Howard Bruce

C. E. Paige

O. H. Fogg

A. B. Day

Samuel Insull, Jr.

"Our Industrial Gas Research Program has developed many new and valuable industrial gas appliances, and therefore has opened up a large field for application of our product.

"Our experience with the research and industrial application of gas has strengthened the faith of our people in research in general, and it should not be confined to the development of appliances. The fields of production and distribution of both manufactured and natural gas offer many opportunities for valuable research. It is therefore of the greatest importance that the Executive Board continue the work according to its best judgment and information as regards the obtaining and application of the necessary funds.

"Whenever practicable the facilities of the Association's Testing Laboratory should be utilized in working out research problems of the industry.

"Notable advance has been shown in the construction of proper rates, both in domestic and industrial fields. Studies of the Rate Lists of 1926 and of 1931 are eloquent of the way in which the industry has responded to the necessity for fair and adequate rate making. Our Committees should continue the studies which have been so helpful in this respect.

"We wish to impress upon the industry the desirability of continued complete support of appliance testing and certification carried on by our testing laboratory. This institution is now firmly established and recognized not only by our members but by officials and the general public. Only domestic gas burning appliances which carry the Laboratory seal of approval should be placed on our lines.

"The Association plan of cooperation with other industries in displays of all gas-burning appliances makes valuable contacts and should be continued and extended wherever advisable, as determined by the Executive Board.

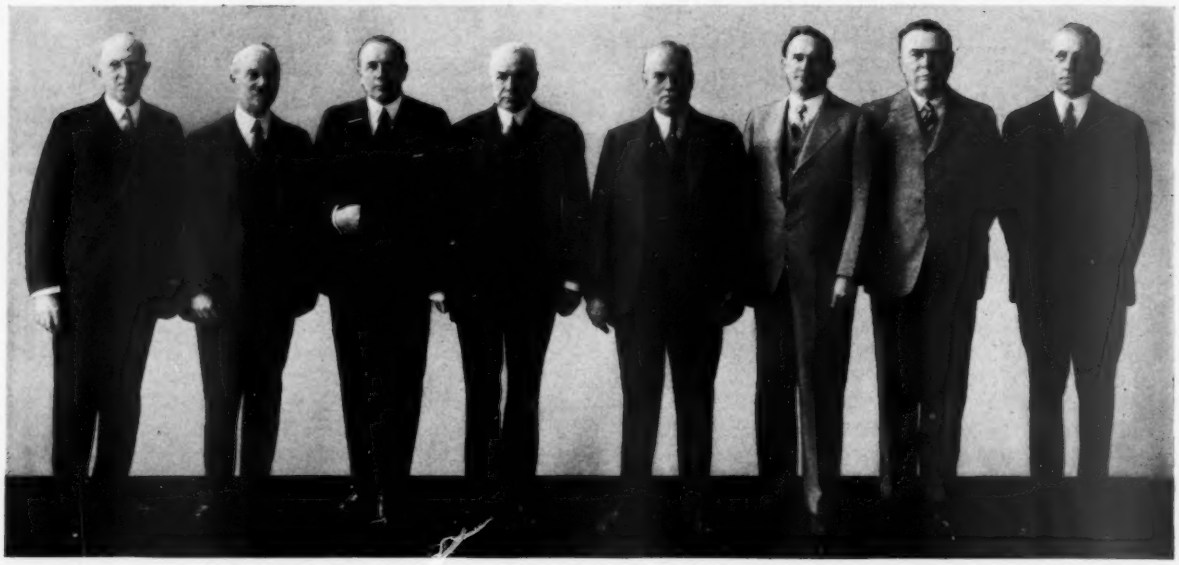
"At the time our Program of 1926 was adopted, we pointed out that the era of attempted legislative limitations on gas rates and revenues appeared to have passed and that it seemed likely that the gas industry might go ahead along constructive lines without fear that political support would be given to the demands of the uninformed. During the past five years, therefore, it has been possible to center emphasis upon the excellence of our engineering and the advancement of our scientific research, as means of improving and extending service and introducing more economic forms of rates.

"There have been practically no evidences of widespread popular dissatisfaction with the conduct of the gas business as such or with the rates charged for gas service. During a period of industrial depression, the gas companies, along with other public utilities under public regulation, have been stable and stabilizing factors in the economic situation. They have gone ahead with rate reductions and with enlargements of facilities, and their well-being has been recognized as a bulwark of the Nation's business.

"Unfortunately, at the present time, attacks upon some branches of the public utility industry and particularly upon corporate structures and the methods of public regulation, have created conditions of agitation which may have repercussions as to the gas business. Radical and restrictive proposals are drafted in general terms which bring gas service within their scope.

"This development will prove

PAST PRESIDENTS ATTEND CONFERENCE



At the Spring Conference of members of the Executive Board and Advisory Council, held at Atlantic City, N. J., May 1 and 2, a noteworthy feature was the presence of all past presidents of the American Gas Association. With the exception of R. B. Brown, who was momentarily absent, all were brought together and this photograph was taken. Those shown in the picture are as follows: D. D. Barnum, President, Boston Consolidated Gas Co., Boston, Mass., J. B. Klumpp, Philadelphia, Pa., C. A. Munroe, New York, N. Y., Geo. B. Cortelyou, President, Consolidated Gas Co. of New York, New York, N. Y., H. C. Abell, Vice-president, Electric Bond & Share Co., New York, N. Y., A. B. Macbeth, President, Southern California Gas Co., Los Angeles, Calif., B. J. Mullaney, Vice-president, The Peoples Gas Light & Coke Co., Chicago, Ill., O. H. Fogg, Vice-president, Consolidated Gas Co., of New York, New York, N. Y.

regrettable, to whatever extent it may hamper and hold back the lines of advance which have been projected. The gas industry has been alertly responsive to changed and changing conditions, and has endeavored to cooperate heartily with all those who are genuinely trying to promote the public interest and better the conditions of service. Basically, however, it may be brought back to mind that as to a utility serving the public with an essential and standard product such as fuel, there are rights of persons and property which may not be violated by political action. Experience has proved that the interests of the public are well served when the gas utilities are regulated and controlled by the State acting through quasi-judicial bodies, independent in status and divorced from political interference.

"It is of the utmost importance that we continue our educational efforts; our employees change continually, and their education must be continuous, and in like manner our customers change, and the public should be given every opportunity of knowing our business. The Association's courses in domestic and industrial salesmanship, in employee-customer relations and its studies in sales management have placed our industry in position to take full advantage of present and future opportunities.

"As was pointed out in the 1926 program, a weakness sometimes discernible in our organization is the tendency of sections and general committees of the Association to work independently of each other. Each section and committee (naturally and laudably) wants to make a good showing during its year in office; hence a tendency to concentrate upon its own immediate objective to the exclusion of all other considerations; but the Association interest lies in continuity of effort and cumulative results. Section and general committee work should be guided with this in mind, that programs and activities may be continuous, and related activities coordinated for the utmost of unity and effectiveness. Further: There is a decided tendency in this Association, as well as all similar bodies, to stray afield in its activities; such action of the Association and its sections should be closely controlled and regulated.

"We should have available at all times for our members and for the financial public, the correct analyses of the essential statistics of the industry. Association headquarters have already made gratifying progress along these lines, at the request and through the splendid cooperation of our member companies.

"In fact, the growing usefulness and importance of the industry, and the manner in which it has met the demands and possibilities of the times are due in greatest measure to the spirit of cooperation and mutual helpfulness which is unexcelled in any other industry with which we are acquainted.

"In this respect our affiliated associations play an important part. Independent and self-governing, they yet cooperate with the National organization, and it is inevitable as time goes on that this cooperation shall be still more important and significant.

"It is encouraging to observe a growing consciousness of the necessity for closer correlation of thought and purpose between trades and industries whose interests are closely related with our own. Sound policies of dealer and allied trade cooperation as developed in a number of localities have demonstrated the wisdom and practical value of such mutually beneficial relations.

"With peculiar force these expressions apply to an understanding of the needs and wishes of our present and potential customers. It is as important for us to understand the viewpoint and the desires of the women of the country, who consume in their homes 70 per cent of our products, as it is important for any industry to take account of the needs of its public.

"Based on the foregoing discussion the following program of American Gas Association activities for the next five years is presented:

"That intensive efforts be made to secure cooperation within the gas industry and with all practicable enterprises and activities outside of the industry, to improve selling methods, to stimulate selling efforts, to enlarge understanding and appreciation of gas service with special emphasis upon water heating, house heating, refrigeration and house cooling as additions to the domestic load.

"That the industry's efforts to promote the increased use of gas service be of the broadest scope and be made to embrace sincere and mutually profitable cooperative relations with dealers, craftsmen and other related trades.

"That our educational efforts be continued, both in and out of the industry, having in view the application of proper rate structures and proper bases for valuation of property used in the public service.

"That technical research in all fields affecting the gas industry be carefully correlated and actively prosecuted.

"That every effort be made to further secure public and dealer recognition of Laboratory approved appliances and to discourage the use of equipment which is not suitable for public use.

"That the Association continue and enlarge upon its program of assembling, so far as possible, through the aid of local gas companies, in cities where conventions are held, displays of domestic, commercial and industrial gas appliances, to be exhibited at such conventions.

"That the Association through a special committee which has been appointed re-consider the subject of national advertising, which should if embarked upon, be fully tied in with local gas companies which are the most important factors in such an undertaking, and should be adequately financed over a sufficient number of years to insure its success.

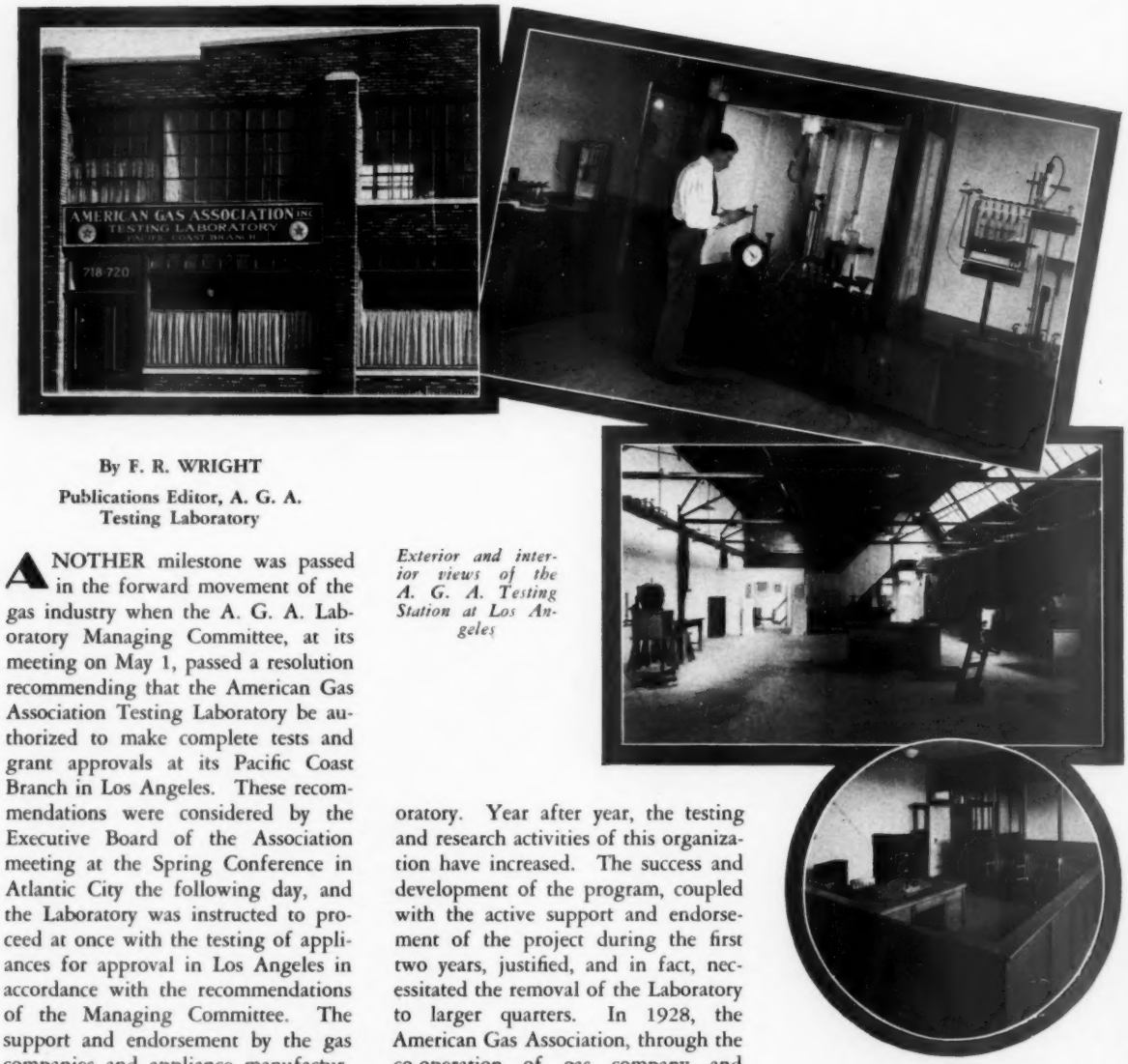
"That the current educational work be carried on; and that the Association continue its support of courses in gas engineering and complete the sales and contact courses of gas company employees.

(Continued on page 281)

AMERICAN GAS ASSOCIATION EXECUTIVE BOARD

This picture of the A. G. A. Executive Board was taken at the Atlantic City Conference. The members are shown as follows: Standing left to right—Kurwin R. Boyes, Secretary, American Gas Association, New York, N. Y., Arthur Stockstrom, Secretary, American Stove Company, St. Louis, Mo., F. A. Lemke, Humphrey Company, Kalamazoo, Mich., E. S. Dickey, Maryland Meter Works, Baltimore, Md., W. C. Beckjord, Vice-president, Boston Consolidated Gas Co., Boston, Mass., F. A. Miller, Chairman of Board, S. R. Dresser Manufacturing Co., Bradford, Pa., J. S. DeHart, Jr., President, Isbell-Porter Co., Newark, N. J., R. G. Griswold, Chief Technologist, H. L. Doherty & Co., New York, N. Y., Alexander Forward, Managing Director, American Gas Association, New York, N. Y. Seated left to right—A. B. Macbeth, President, Southern California Gas Co., Los Angeles, Calif., O. H. Fogg, Vice-president, Consolidated Gas Co. of New York, New York, N. Y., R. W. Gallagher, Vice-president, American Gas Association, President, East Ohio Gas Co., Cleveland, Ohio, C. E. Paige, President, American Gas Association, Vice-president, The Brooklyn Union Gas Company, Brooklyn, N. Y., Arthur Hewitt, Vice-president, American Gas Association, Vice-president, Consumers Gas Company, Tor. Ont. Can., H. C. Abell, Vice-president. Electric Bond & Share Co., New York, N. Y., B. J. Mullaney, Vice-president, The Peoples Gas Light & Coke Co., Chicago, Ill.

Complete Testing Starts at Pacific Coast Laboratory



Exterior and interior views of the A. G. A. Testing Station at Los Angeles

By F. R. WRIGHT
Publications Editor, A. G. A. Testing Laboratory

ANOTHER milestone was passed in the forward movement of the gas industry when the A. G. A. Laboratory Managing Committee, at its meeting on May 1, passed a resolution recommending that the American Gas Association Testing Laboratory be authorized to make complete tests and grant approvals at its Pacific Coast Branch in Los Angeles. These recommendations were considered by the Executive Board of the Association meeting at the Spring Conference in Atlantic City the following day, and the Laboratory was instructed to proceed at once with the testing of appliances for approval in Los Angeles in accordance with the recommendations of the Managing Committee. The support and endorsement by the gas companies and appliance manufacturers, of the testing and certification program carried out at the Cleveland Laboratory is adequate assurance of the success of the Branch Laboratory on the Pacific Coast.

It would be a difficult matter to find an enterprise which would more clearly symbolize the word "progress" than that of the American Gas Association's Gas Appliance Testing Laboratory. Year after year, the testing and research activities of this organization have increased. The success and development of the program, coupled with the active support and endorsement of the project during the first two years, justified, and in fact, necessitated the removal of the Laboratory to larger quarters. In 1928, the American Gas Association, through the co-operation of gas company and manufacturer members, erected and equipped a new laboratory building, the largest exclusive gas appliance testing and research organization of its kind in existence.

Another and most noteworthy achievement in the development of this movement was the establishment of the branch laboratory on the Pacific Coast. The progress of the gas industry in that territory has been very rapid during the past few years. Manufacturer and gas company executives in the Pacific Coast area have been unusually active in their support and encouragement of the Testing Laboratory in Cleveland, notwithstanding the wide distance intervening. The delay to manufacturers in securing approval on their appliances besides the addi-

tional expense occasioned by their being such a great distance from the Laboratory, has been a handicap to these manufacturers and has been a matter of much concern to officials of the Laboratory and the Association.

On January 1, 1927, there were only nine manufacturers of approved gas appliances on the Pacific Coast, among which were three manufacturers of ranges, two of water heaters, and four of central heating gas appliances, while at the end of 1930, about 43 per cent of all manufacturers of approved central heating gas appliances, and approximately 23 per cent of the total number of manufacturers of all types of approved gas appliances in the United States and Canada were located in that territory.

In view of these and other considerations, the A. G. A. Laboratory Managing Committee felt justified in recommending the establishment of a preliminary testing and inspection station in that region. This recommendation was approved by the Executive Board of the American Gas Association in October of last year. Arrangements were thereupon immediately made for securing a suitable site for the Laboratory and the installation of the necessary equipment. The matter of the logical location for the station was discussed with gas company and manufacturer representatives of the Pacific Coast area, and Los Angeles was finally selected as being the most centrally located, since approximately 70 per cent of all manufacturers of approved appliances on the Pacific Coast are located in that vicinity. A suitable building was leased at 718 Towne Avenue, Los Angeles, and arrangements made for the necessary remodeling and the installation of piping and equipment.

W. M. Couzens, formerly Chief Inspector of the A. G. A. Testing Laboratory, was made Supervisor of the Pacific Coast Branch Laboratory, and all work in connection with activities there are under his immediate supervision.

The task of remodeling and equipping the building preparatory to starting test work has progressed satisfactorily. Two gas holders were erected for the storage of the two types of manufactured gas and for test purposes. Natural gas only is distributed in Los Angeles during the greater part of the year. It was therefore necessary to secure a supply of manufactured gas for test purposes from some other source. The San Diego Consolidated Gas and Electric Company generously offered to supply this gas and also donated the use of a suitable building for the installation of a compressor. Some delay was occasioned in securing a compressor and getting it installed, but it was finally completed and put into operation. The co-operation of the Consolidated Gas and Electric Company in furnishing a building and putting in the foundation for the compressor was of great assistance and avoided considerable delay in completing this part of the project. This company has also volunteered to furnish the necessary labor for operation of the compressor.

The manufactured gas for use at the Laboratory will be compressed in cylinders, shipped to Los Angeles, and there transferred to holders from which it will be piped to the various testing stations.

All preliminary arrangements were completed by the middle of April and everything was in readiness to begin preliminary testing.

It was originally intended to make the Pacific Coast Branch a preliminary testing and inspection station only, but by the time the Laboratory was ready to function, nearly 100 applications had been filed by manufacturers for complete approval tests on their appliances. Eight ranges, three water heaters, four furnaces and seven space heaters had already been submitted for test and the balance were being held pending instructions from the Laboratory.

Gas companies and manufacturers on the Pacific Coast felt that as long as a branch testing laboratory was located there, all tests necessary for complete approval should be made and thus avoid the added expense and time that would be expended in sending the appliances to Cleveland. Therefore, in view of the fact that the Los Angeles Laboratory is equipped to carry out tests on all types of domestic gas appliances, and because of the large volume of testing work in that territory, complete approval testing seemed to be the only logical course to follow. This procedure will result in considerable saving of time and money to manufacturers in the Western Coast area, and will enable the American Gas Association to be of much greater service to the gas industry in that territory.

The large number of appliances now awaiting approval tests will keep the Branch Laboratory extremely busy for many weeks and it is anticipated that the number of requests for approval tests will be greatly increased when manufacturers learn that complete approval can be secured in Los Angeles.

Two additional members of the Cleveland staff were transferred to Los Angeles early in May to assist with the testing work there. It is evident that the Branch Laboratory staff will have to be further increased within the near future in order to satisfactorily handle the large volume of testing work.

At this writing, the Pacific Coast Branch Laboratory is equipped to conduct complete approval tests on all types of domestic appliances with the execption of gas warm-air furnaces. Before approval can be granted on this type of appliance, it will be necessary to install a Thomas meter for efficiency determinations. This apparatus is being procured; consequently, complete approval of furnaces will be possible in the near future.

A. G. A. Executives To Attend International Gas Conference

THE American Gas Association will be represented at the First International Conference and sixty-eighth annual general meeting of the Institution of Gas Engineers, at London, England, June 2-5, by Clifford E. Paige, president, and Alexander Forward, managing director. Mr. Paige sailed for England on May 6, while Major Forward left New York May 23.

Mr. Paige will carry a message from the industry in the United States and Canada to the gas men assembled at London. He will speak on "The Gas Industry in America."

After participating in the London conference, Major Forward will go to Breslau to take part in the annual meeting of the German Gas and Water Association, which will take place June 8-10.

New England Gas Exhibit Scores Success

Group of manufacturers of Gas Appliances taking part in New England Exhibit. They are as follows: Seated, left to right—J. D. Taylor, Walker & Pratt Mfg. Company; J. H. McPherson, Clow Gasteam Heating Co.; A. M. Slattery, The Hoffman Heater Company; Harry King, Standard Gas Equipment Co.; George P. Velte, American Stove Company. Standing, left to right—C. A. Lucky, Copper Boilers, Inc.; Mr. Mitchell, Tufts Meter Works; L. Giffine, Clow Gasteam Heating Co.; Mr. Mayo, Bryan Engineering Co.; J. Silver, Vincent Mfg. Co.; J. C. Aaron, Glenwood Range Co.; A. B. Coop Bryan Mfg. Co.; C. Kingsbury, American Stove Company; A. Cole, Kompak Heater Company; Mr. Yeo, American Stove Company; Mr. La Voy, Standard Gas Equipment Co.; C. R. Kimball, Walker & Pratt Mfg. Co.; Charles Breen, Geo. D. Roper Corporation; J. Dalton, Chambers-Chester Company; Norman Griffith, Estate Stove Co.; A. W. Sampson, Kompak Heater Company; Edwin Sloat, Estate Stove Company; Fred K. Wells, Enterprise Heater Company.

By A. M. SLATTERY, Chairman,
Manufacturers' Division, New England Gas Association

WELL may the gas industry of New England be proud of its display at the Modern Homes Exposition held at the Boston Garden on April 15—22.

Under the auspices of the Manufacturers' Division of the New England Gas Association, and with the co-operation of the gas companies of Greater Boston, a complete and well conceived exhibit of gas appliances was presented.

An area of 3456 sq.ft., centrally located and close to a main entrance of the Garden, was reserved for the gas exhibit, the center position of which was occupied by the gas companies' display and flanked by the individual booths of participating manufacturers. The following gas companies cooperated in this undertaking:

Arlington Gas Light Company, Boston Consolidated Gas Company, Brockton Gas Light Company, Cambridge Gas Light Company, Lynn Gas & Electric Company, Malden & Melrose Gas Light Company, Old Colony Gas Company and Suburban Gas & Electric Company.

The manufacturers who exhibited were as follows:

American Stove Company, Bryan Engineering Company, Bryant Heater & Manufacturing Company, Chambers-Chester Company, Copper Boilers, Inc., Clow Gasteam Heating Company, Electrolux Refrigerator Sales, Inc., Enterprise Heater Company, Estate Stove Company, Glenwood Range Company, Hoffman Heater Company, Kernit Incinerator Company, The Kompak Company, W. E. Lamneck Company, George D. Roper Corporation, Ruud Manufacturing Company, Standard Gas Equipment Corporation, Tufts Meter Company, Universal Appliance Company, Vincent Manufacturing Company, Walker & Pratt Mfg. Company and The White Warner Company.

Supplementing the manufacturer representatives in charge of their separate booths the gas companies provided personnel of six salesmen.

To stimulate attendance 500,000 tickets of admission were mailed by the Greater Boston gas companies to their customers while 10,000 were distributed by the manufacturers exhibiting. All previous records for the number of visitors were exceeded, the total attendance for the week amounting to 300,000 people.

Gas companies and manufacturers alike have reported most satisfactory returns from the exhibit in the number of prospects developed, new accounts secured, and general interest displayed in the gas appliances shown. These favorable results demonstrate conclusively that display and exhibit are vital forces in any program of merchandising and selling.

Among interested visitors at the exhibit was C. W. Berghorn, secretary of the Manufacturing Section, American Gas Association.

Eight employees of The Peoples Gas Light and Coke Company who received McCarter Medals. They are as follows: Top row, left to right—Leo Smith, Edward Maloney, Frank M. Barker, John Murray. Bottom row—Michael Garrity, Ralph H. Acerenza, Edward T. Selcke, John M. Walsh

Eight Receive McCarter Medals for Life-Saving

EIGHT employees of The Peoples Gas Light and Coke Company, Chicago, Ill., were the central figures in a presentation of Thomas N. McCarter medals for saving lives, the ceremony having a prominent part in the program at the annual meeting of the Peoples Gas Club.

B. J. Mullaney, vice-president, presented six medals, one bar and one certificate to six shop men and two meter readers whose successful resuscitation of victims of gas asphyxiation entitled them to this signal honor.

In his introductory remarks, Mr. Mullaney said that these awards are provided through the generosity of Thomas N. McCarter, president of the Public Service Electric and Gas Company of New Jersey. Awards are made to employees of member companies of the American Gas Association who save human life by means of the Schafer prone pressure method of artificial respiration.

The McCarter medal, explained Mr. Mullaney, is awarded to the person directly responsible for the resuscitation; the bar is an attachment for the medal to signify a second or subsequent resuscitation by the same person. The certificate is awarded to a person or persons who assist and actually take part in successful use of this method.

Since the announcement of the McCarter award January, 1923, there have been issued 319 medals, 19 bars and 133 certificates, of which employees of our company have received 21 medals, 2 bars and 3 certificates. In all, employes of the Peoples Company have saved the lives of 23 persons. Mr. Mullaney mentioned the fact that in addition to the foregoing, two other awards for gas company employees were pending, announcement of which would be made during the year.

Frank M. Barker, fitter at West Division, received a McCarter bar because of his third successful case of resuscitation. On December 16, 1929, while engaged in his work, he found a man overcome by gas escaping from a broken fixture. Barker worked 45 minutes before he was successful in reviving the patient.

John Murray, street mechanic at North Division, was awarded a medal for saving the life of a man overcome by gas seeping through a broken service January 26, 1929. After twenty minutes work the patient was revived.

Michael Garrity, fitter's helper at North Division, received a McCarter certificate for valuable assistance rendered in the case cited above.

Ralph H. Acerenza, meter reader, received a medal for saving the life of a young woman December 17, 1929.

Edward T. Selcke, meter reader, was awarded a medal for saving a man's life January 17, 1930.

John M. Walsh, general service foreman at North Division, received a medal for saving the life of a woman overcome by gas January 20, 1930. Thirty minutes work was necessary to revive the patient.

Edward Maloney, service foreman at North Division, was awarded a McCarter medal for saving a young man's life on the same day and at the same address where Mr. Walsh did such good work.

Leo Smith, fitter at North Division, was awarded a McCarter medal for saving a man's life March 10, 1930.

Statistics—

Their Function and Development in the Gas Appliance Industry

By PAUL RYAN
Statistician, American Gas Association

BEFORE considering the function and development of statistics in the gas appliance industry, it would seem advisable to review very briefly some of the existing statistical work now being conducted at American Gas Association Headquarters; since much of this work has been, and will doubtless continue to be, of great importance to manufacturer members. In this connection it should be remembered that the Statistical Department of the Association is hardly more than three years old. Its first major undertaking was to secure as comprehensive data as possibile covering all phases of the manufactured gas industry. Needless to say this was no easy undertaking because it became evident in the course of this work that even among the gas utilities, protected as they were from the direct competition of one another, there was still a great deal of reluctance to give out information on a particular company. Yet the success that has been obtained in this particular line of endeavor is probably well-known by this time. Perhaps the next major undertaking of the Association's Statistical Department was the acquisition of data on the natural gas industry. Here, again, the same problem involving reluctance of individual companies to supply data on their operations was encountered. It might be stated that possibly the hardest and most difficult task involved in both of these undertakings was to secure the confidence of both the manufactured and natural branches of the industry that the data relating to any particular company would be held in strict confidence. That this confidence has been secured is attested by the fact that at the present time a great deal of valuable and useful information covering the various states, geographic regions and information on the country as a whole has been made available through the cooperation of member gas companies. This fact is mentioned at the outset because many manufacturers are somewhat unaware of the existing statistical material available at Headquarters which would be of definite usefulness and value to them.

One of the newest of these statistical activities and one particularly designed for manufacturer members is a pamphlet entitled "News Items Relating to Extensions of Service." This publication, issued about every two months, contains matter of great interest to manufacturers who are primarily concerned with the development of new markets for their product. It contains a list of all the new communities where gas service has been inaugurated and also lists new towns in which franchises have been granted. It is thus of considerable value to the manufacturers as indicating territories where there is, or will soon be, a marked increase in gas customers. Its importance is indicated by the fact that the mailing list has now reached over 800 individuals, all by special request.

Another publication of the Statistical Department which has proved of considerable value to manufacturers has been the list of communities supplied with gas. This publication is not yet available for the current year, but will be published shortly. It contains a complete list of every community in the country supplied with gas and indicates for each community the kind of gas used, together with heating value, population of the community and the number of meters. This is frequently used by manufacturers in checking up on the effectiveness of their sales activities in various sections of the country.

Another publication, much in demand by manufacturers is the *Rate List.* This contains a complete list of all the various rate schedules for practically every town served with manufactured, natural or butane gas in the country and is constantly referred to in determining the gas company rate schedules for any community in which a manufacturer may be interested.

There is also issued annually a list of gas companies having special rates for house heating. While all of this material is contained in the *Rate List,* it is scattered through this volume so that a manufacturer of house heating equipment would have to go through the entire book in order to find out what situations would afford the best outlet for his equipment. This publication brings together in convenient form a list of those gas companies whose interest in house heating is evidenced by the installation of a separate rate designed to secure this class of business.

The list of gas companies having special rates for water heating is similar in scope and content to the list just mentioned, except that it is designed primarily for water heater manufacturers. In the case of this publication it should be noted that only those companies are listed which have definitely specialized rates designed for the promotion of water heating business. In addition to such companies there are, of course, many others whose general service rates are sufficiently attractive to secure this type of business.

Another publication of interest to manufacturers deals with the trend of gas rate structures in the United States, and indicates the changes that have occurred in the rate structure and rate making theory during the past few years. Its chief use to the manufacturer of appliances is that it enables him to spot quickly those states which have been most progressive in adopting rate schedules designed to promote the use of gas for cooking as well as water heating and house heating and is therefore of some assistance in spotting the territories where the sales of such appliances should be facilitated by proper rate structures.

The *Monthly Summary of Gas Company Statistics,* issued each month, contains data on customers, sales and revenue for a group of manufactured

Presented before Range Manufacturers at White Sulphur Springs, W. Va., May 8, 1931.

and natural gas companies, representing almost 90 per cent of the industry. This data is shown each month, not only for the country as a whole, but by the states and geographic regions. While this was designed primarily for the use of the gas companies themselves, it has been in considerable demand by manufacturer members owing to the fact that it gives a current over-all picture of the activities of the industry as a whole. It is also of value to them in indicating those sections where the gas business seems to be better or worse than normal so that they may evaluate their sales policies in those regions accordingly.

There is also available to manufacturer members, the *Annual Statistical Bulletin* which probably embraces the best over-all picture of the manufactured gas industry obtainable in one pamphlet. It contains all the basic data on the manufactured gas industry for a period of ten years back and while it is not as definitely applicable to the manufacturer of appliances as some of the publications previously mentioned, it has been of distinct value in affording a general picture from year to year of the operations of the industry as a whole.

These publications and pamphlets have been mentioned primarily to emphasize the fact that there is already available at Association Headquarters a great deal of data which can be of assistance to manufacturer members.

This somewhat brief summary of the statistics now available at Association Headquarters through the cooperation of member gas companies, leads to a consideration of the development, not of generalized statistics of the industry as a whole, but more particularly the collection of data relating specifically to manufacturers of gas appliances.

It is because of these reasons that every conceivable precaution has been taken to insure the confidential nature of individual manufacturers reports. In the first place companies will report only by code numbers, and in addition, the reports of individual companies will be destroyed after inclusion in the totals.

In conclusion it may be stated that there has hardly been a time in the history of the gas appliance industry when adequate and comprehensive information was as badly needed as at present. That Association Headquarters stand ready and fully equipped to render this service. And that its full achievement can be attained only through the confidence and cooperation of the individual manufacturer.

If the manufacturer is to effectively regulate his production, sales, and general merchandising policies in harmony with prevailing economic conditions there must be available for his use adequate and comprehensive statistical information on his own industry as a whole. For this reason the Headquarters Statistical Department is now engaged in the collection of certain statistical data which it is believed will be of maximum use and benefit to the gas appliance industry at large. For those who are not entirely familiar with this project, it may be mentioned that this information in essentials embraces monthly data on production and stocks, in physical units; and shipments, both in physical units and dollar volume, and covers the major gas consuming appliances. Such data when taken in conjunction with surveys of the unsold field should be a valuable guide to future sales activity, and the compilation of monthly totals should afford each manufacturer information as to the percentage of total business coming to him. In order to afford comparisons from year to year at the earliest possible date reports are desired for 1930 and 1931 concurrently, that is, when first report for January 1931 is made up a similar report for January 1930 should also be compiled. In this way it will be possible to provide year to year comparisons from the beginning of the service.

The essential necessity for adequate and comprehensive statistical information on the gas appliance industry might be summarized by the statement that such data are not only of the utmost value to the average manufacturer in the day to day operation of his business, but more important still, they form the basis or groundwork upon which any expansion of services to this branch of the industry must be predicated.

Among the more important services which might ultimately be of value to this phase of the industry, the following may be mentioned:

1. Uniform cost accounting, facilitating the accumulation of cost figures which will be on a uniform basis and thus tend to prevent the pricing of goods on an unsound economic basis.
2. Simplified practice, resulting in elimination of unnecessary variety in the products of the industry, with consequent decrease in the amount of stocks to be carried.
3. Standardization, which stabilizes production and employment, reduces selling costs, and makes possible lower unit costs to the public through mass production, as demonstrated through the standardization of incandescent lamps, and automobiles.
4. Traffic and transportation studies, affording substantial saving to shippers through maximum loading of freight cars, better packing methods, reduction of loss and damage claims, as well as many other complex problems attending freight traffic conditions at the present time.

The advisability and desirability of these, and many other corollary services to the Manufacturers' Section, cannot be properly evaluated or appraised unless there is available sound, adequate and comprehensive statistical information on this phase of the industry.

But the most important advantage accruing from the collection and dissemination of such statistical data would be that all those engaged in the industry would be on an equal basis regarding knowledge of the basic industrial facts so that each manufacturer could regulate not only his prices but his sales and production policies to accord with general business conditions.

It would seem needless to dwell longer on the function or desirability of statistics on the gas appliance industry, since the consensus of opinion among leading manufacturers seems definitely to be that the need for statistics is apparent and their value to the industry as a whole and to the individual manufacturer is conceded.

The major problem remains however, of developing this service to the industry. And it may be stated at the outset that this development will depend completely upon securing the confidence and cooperation of the individual manufacturer.

It was pointed out at the beginning of this paper that the hardest and the most difficult task involved in attempting to build up a statistical service for the manufactured and natural gas utilities was to secure the confidence of these companies that no data relating to an individual company would ever be divulged. And it seems probable that the establishment of this confidence among manufacturers will be equally if not even more difficult.

Technical and Practical Requirements Of Modern Forge Furnaces

—Recent Developments To Meet Them With Gas

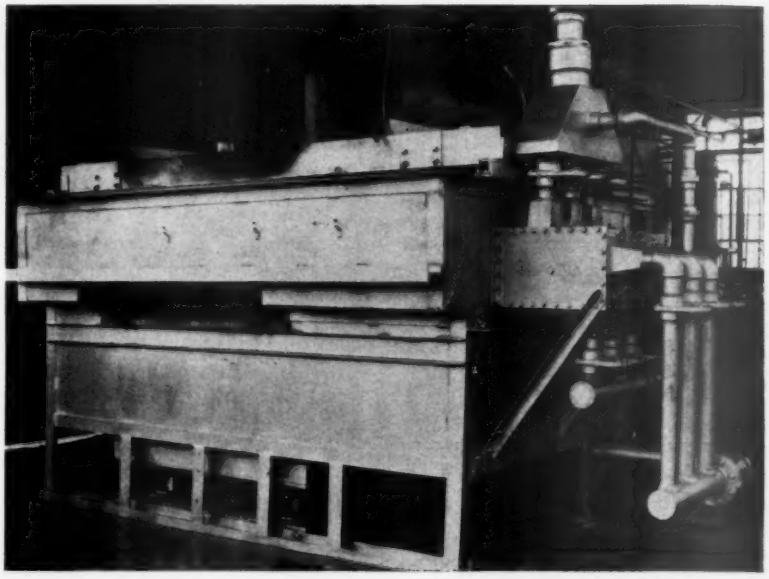
By WILLIAM LEHRER
and
A. B. BARBER

THE extensive investigations conducted by W. E. Jominy for the Committee on Industrial Gas Research of the American Gas Association on the various problems involved in the heating of steel to forging temperatures have conclusively established the metallurgical requirements which must be met by a properly designed forge furnace.

A brief study of these requirements will disclose that the two outstanding factors are the operating temperature and the furnace atmosphere.

The importance of the temperature is obvious and has been recognized early in the manufacture of forgings. It has been a well-known fact that too high an operating temperature will cause overheating or even burning of the steel although the maximum safe forging temperature for the different kinds of steel have been determined only recently by Mr. Jominy. A high operating temperature has generally been favored by operators as it reduces the time and the labor required for the forging operation. Under these conditions, however, the hazard of overheating and burning the steel is so great that the saving in time and labor might be offset by the rejection of a number of burned forgings.

A high operating temperature also shortens the refractory life. The slagging and the dripping of the side walls and of the roof can be eliminated by the proper selection of a refractory material which resists high temperatures. In the majority of forge furnaces, which necessarily operate at a high temperature, great difficulties are experienced in keeping the hearth free from slag. The scale formed on the steel in heating partially peals off in the furnace or is even melted off at excessively high temperatures. The reaction of the iron-oxides with the refractories produces a flux of low melting point. The scale slag and the flux have to be removed frequently as they are easily picked up by the steel and are pounded into the metal surface during the forging operation causing a defective forging. The removal of the flux or slag usually involves time and labor and the destructive action of the slag on the refractories results in an additional expense due to the necessary repairs or replacements of the hearth and of the lower portion of the side walls. The use of neutral refractories such as chrome ore prevents the formation of the flux but does not remove the hazard of having the hearth covered with a layer of molten scale slag.



Diffusion flame gas blanketed forge. A product of American Gas Association Industrial Research

This difficulty can be overcome by operating the furnace at a temperature below the melting point of the scale. In many cases this is impossible because the steel when heated much below the scaling temperature is hardly forgeable. The only safeguard against detrimental temperatures is automatic temperature control. The ideal operation would naturally consist in regulating the fuel supply by the actual temperature of the steel. Generally this is impractical. However, once the relationship between the actual work temperature and the furnace temperature has been determined, a satisfactory control is secured by utilizing the furnace temperature to regulate the heat input. Automatic temperature control also has the advantage of reducing the fuel consumption per pound of steel, thus increasing the overall efficiency of the operation.

Importance of the Kind of Scale

In years past little attention has been paid to the proper atmosphere in the

forge furnaces apparently because scaling of the steel was considered an unavoidable evil. It was known, however, that there is quite a difference in the types of scale formed and that the common terms applied in the forge shop to the different iron-oxides designated their nature. Most manufacturers of forging prefer oil as the fuel. They rightly claim that the scale formed in an oil-fired furnace is soft and loose, whereas some other types of furnaces, including the ordinary gas forge, produce a hard and sticky scale which is not only pounded into the metal during the process of forging, causing considerable scrap losses, but also acts as an abrasive on the forging dies.

The great extent that die life is depending upon the type of scale covering the surface of the metal to be forged may be best illustrated by the results of a comparative test conducted as part of the A. G. A. Forging Research on an ordinary gas-fired furnace and on an oil-fired furnace. When heating the steel in the gas-fired forge, the number of forgings made with one set of dies averaged 20,000 which was equivalent to 34.6 tons of steel. The dies had to be retouched for every 7.5 tons of steel forged. When operating the oil-fired furnace, the die life was almost doubled. The only explanation of this vast difference could be found in the soft loose scale formed in the oil-fired furnace. The results of these tests showed a saving of $4.40 per ton of steel. The itemized savings which were made by changing over from ordinary gas-firing to oil-firing were:

$ .70	per ton saving on fuel cost;
1.80	per ton saving on amount of retouching dies;
2.90	per ton saving on die life;
$4.40	per ton total saving.

This striking example brings out two interesting facts: first, the relative unimportance in some modern production forge shops of the fuel cost in forging as compared with the other costs of this operation, and second, the necessity of so heating the steel as to eliminate scale and, therefore, cut down die cost and upkeep.

There are two methods of at least reducing the degree of oxidation of the steel in heating. As scaling is a direct function of oxidation this undesirable by-product of the heating process can be reduced or eliminated by controlling the degree of oxidation. The *amount* of scale formed depends upon the time of exposure, the temperature, and the furnace atmosphere whereas the *type* of scale is determined entirely by the atmosphere. If the steel is heated, therefore, in the shortest possible time, a minimum amount of scale will be produced in a fixed furnace atmosphere. Rapid heating of the steel is usually objected to by the manufacturers of forgings. The fear of setting up strains in the metal due to great temperature differences between the surface and the center is fully justified when large pieces of steel are heated, that is, whenever the ratio of the surface to the volume of the steel is small. The sizes of the steel bars most frequently found in forge shops will hardly show any great temperature inequalities, even at the fastest possible heating rates. The ratio of surface to volume of these steel bars is to great and the distance from the surface to the center is so short that heat transfer by the conductivity of the metal conveys the heat to the center almost as fast as the surface absorbs it.

Reducing the Amount of Scale

At first, it may seem possible to secure a fast heating rate of the steel simply by operating forge furnaces at a thermal head several hundred degrees higher than the desired forging temperature of the steel. In order to prevent overheating or burning, the steel has to be withdrawn from the furnace as soon as it has reached the proper temperature. Any soaking is impossible.

The rapid heating rate of the steel should, if possible, be obtained by a fast rate of heat transfer from the flame itself. It is a well-known fact that the rate of heat transfer by radiation as expressed by the Stefan-Boltzmann's law is superior to that of convection. A luminous flame which has high luminosity is, therefore, essential in a modern forge furnace. The high luminosity of the oil flame is one of the main reasons why, at the present time, oil-fired furnaces are used so extensively in forge shops.

The second method of reducing the degree of oxidation of the steel is to maintain a reducing atmosphere in the furnace. An atmosphere of two to three per cent CO does not prevent scaling, it merely decreases the rate of scaling. A more reducing atmosphere cannot be secured in an ordinary forge furnace without greatly lowering the efficiency or even the operating temperature. The concentration of the reducing and of the oxidizing constituents of the gases in the furnace is the most determining factor of the rate of oxidation and of the final amount of scale produced. The A. G. A. research has shown that oxidizing gases present in a forge are oxygen, carbon dioxide and water vapor. The reducing gases are hydrogen, carbon monoxide and the hydrocarbons. Hydrogen has the characteristic of being a poor reducing agent at low temperatures, whereas, at forging temperatures, it is a better reducing agent than carbon monoxide. Nitrogen, which is an inert gas, is a diluent for the active gases. In practically all forge furnaces, gas-fired as well as oil-fired, the concentration of the gases is such that the action of the oxidizing gases is much stronger than the counteraction of the reducing gases, thus causing scaling of the steel. The oxidation of the metal can be entirely eliminated only when the concentration of the gases is approximately equal to a ratio of four parts of reducing gases to one part of oxidizing gases. If the reducing gases of this non-scaling atmosphere are chiefly composed of carbon monoxide and hydrocarbons, the atmosphere will be carburizing, and if the steel is heated in such an atmosphere excessively long, the surface of the steel will be carburized and the melting point of the outside metal will be lowered. Pitting or even actual melting of the steel will be the result. As any scale covering the steel acts as a protection against carburization, it is evident that, by eliminating scaling, an ideal condition is set up for carburization of the metal.

The importance of heating the steel in a non-scaling atmosphere as regards die life and upkeep was outlined above. In addition to these savings on time, labor and material, such heating has further advantages of great significance. The less scale formed during the heating process, the smoother will be the surface of the finished forging and the better are the chances of pro-

ducing perfectly dimensioned forgings. Mr. Jominy's work on overheating and burning of steel also shows conclusively that the steels containing less than one per cent carbon can be safely heated to a higher temperature in a reducing atmosphere than in an oxidizing atmosphere. This feature certainly should be of great importance to the manufacturers of forgings as it reduces the cost of making the forging and improves the quality of the finished product.

The question arises if it is possible to build a gas forge furnace which will meet these demands. The automatic control of the temperature does not present any difficulty. In fact, several forge shops have already equipped part of their furnaces with automatic temperature control which results in less scrap forgings, in a greater uniformity of the finished forgings and in a better efficiency of operation. The control of the proper furnace atmosphere represents, together with high rates of heating, the main problem. An accurate control of the atmosphere depends largely upon the type of fuel used for heating. The ideal fuel is gas. The many advantages of this fuel are well known. The accuracy of the control of the temperature and the atmosphere in a gas-fired furnace distinguishes gas as the outstanding fuel. Its only drawback is the higher cost, but if properly applied, savings can be made many times offsetting the increase of the fuel cost.

The Diffusion Flame Forge

Surface Combustion Corporation, under the sponsorship of the Committee on Industrial Gas Research, recognizing the necessity of developing gas forge furnaces which will meet these metallurgical requirements, has carried out a number of tests along this line. While the main object was to heat the steel to forging temperatures without producing any scale, all other metallurgical conditions had to be kept under control quite as closely.

A long series of attacks on this problem have been made. As one of the first steps, the possibilities of a muffle type furnace were investigated. An experimental forge furnace was built consisting of a sillimanite muffle heated from top and bottom by four Surface Combustion burners. The internal dimensions of the muffle were 2½" high, 15" deep and 30" wide. A perforated pipe was provided at the lower lip of the furnace slot. The object was to flood the muffle with raw gas and exclude all air. The furnace was a success as far as the elimination of scale was concerned. One inch diameter steel bars held at 2400 deg. F. for 40 minutes in an atmosphere containing 13 per cent CO were practically free from scale. The data obtained on the capacity and the efficiency, however, proved the impracticability of a muffle type forge furnace. In order to secure a forging temperature of 2450 deg. F. inside the muffle, it was necessary to maintain a temperature of 3130 deg. F. in the combustion chambers. This tremendous temperature differential was dictated by the low rate of heat transfer through the refractory muffle. The use of carborundum in place of the sillimanite greatly reduced the temperatures difference. In spite of this improvement, the efficiency was only about two per cent including the saving due to preheating the air required for combustion. The heating rate of the furnace was 20 pounds of steel per square foot of hearth area per hour. These low figures are readily accounted for when keeping in mind that the extremely high temperatures in the combustion chambers result in a correspondingly high flue gas temperature, thus reducing the available B.t.u.'s of the gas to a minimum. Under these most unfavorable heating conditions, the refractory life of the muffle proved to be very short. The use of a muffle type gas forge furnace, therefore, seems to be out of the question except for very special applications. Many other ways of applying heat were tried and closely studied, but were abandoned in turn.

During this period, a study was made of the effect of the luminosity of flames on the rate of heat transmission in forge furnaces. Although the procedure of this investigation which was carried out on an open-flame standard S. C. C. slot forge, was rather crude, sufficient data was gathered to show the superiority of the luminous gas flame over the non-luminous flame, and its wonderful possibilities if it could be applied in a practical manner.

It appears that the practical answer to the problem of applying radiant gas heat to forging and at the same time controlling the other factors mentioned has been found. It has taken the form of applying the new phenomena of "diffusion flame combustion" to forging with a blanket of highly reducing gases surrounding the steel billets the entire time they are in the furnace. This development is the most important outcome of the A. G. A. Forging Research and is a product of the research laboratories of the Surface Combustion Corporation based on A. G. A. metallurgical research in forging at the Department of Engineering Research, University of Michigan.

This type of gas forge produces scale-free work. In this type of combustion, the inter-diffusion of the air and the gas which issue from the burner in separate layers is relied on to mix the two gases at a slow rate. Since oxygen is not present in sufficient quantities, the hydrocarbons of the gas break down into hydrogen and free carbon which, heated to incandescence by the combustion of the surrounding gases, is the source of the luminosity of the flame. The intensity of the luminosity of such a gas flame is at least equal to that of the oil flame. By working out proper designs of the diffusion flame burner, an emissivity factor as high as 0.6 has been secured. The importance of a high emissivity is pointed out by the Stefan-Boltzmann's law which states that the rate of heat transmitted by radiation is directly proportional to the emissivity of the radiating body. Since the energy transmitted is also proportional to the fourth power of the absolute temperatures and since the flame has a high emissivity factor, only a relatively small temperature difference is sufficient to cause a considerable rate of heat transfer. Practically, this means a relatively low head temperature and the hazard of overheating or burning the steel is thus eliminated.

Using a Gas Blanket

The forge in its present form is equipped with one diffusion flame gas burner and is so designed that the flame travels through the furnace chamber and is doubled back in a return duct which is built most advantageously right under the hearth. The

hearth is, therefore, heated from above by radiation and convection, and by conductivity from below. As the diffusion flame burner and the furnace design secure a parallel flow of the gases, it is possible to provide a raw gas duct in such a way that the steel is heated while being blanketed in an atmosphere of raw gas or raw gas plus products of combustion. If the steel bars placed on the hearth are kept just below the protecting gas blanket, any turbulence destroying the effectiveness of the blanket is prevented. The gas blanket is naturally most effective in the portion of the furnace near the burner because, due to the gradual interdiffusion of air and gas, part of the gas forming the blanket is burned as the flame travels towards the far end of the furnace. In an experimental slot forge furnace the design of which was based on the principles outlined, the atmosphere at the far end of a five-foot slot was still highly reducing and the steel heated in this zone was practically scale free. The steel heated in the portion of the slot near the burner was slightly carburized, clearly demonstrating the nature of the reducing atmosphere in this zone.

The Diffusion Flame Forge is of the flat arch type, the slot being 2 inches high and 60 inches wide. The cross-sectional area of the actual furnace chamber is 27 inches deep and 11½ inches high. The hearth upon which the 1⅜ inch diameter steel bars rest was lowered 1½ inches below the bottom of the burner for the reasons outlined above. The slot opening begins at a point two feet from the burner. A preheat zone is necessary because the air and gas issuing from the burner are cold and reach a forging temperature about 18 inches from the burner. The temperature throughout the entire width can be maintained very uniform. The furnace is equipped with an automatic temperature control. In any in and out type forge furnace part of the bars to be heated are cold, whereas, the others are up to forging heat. The proper automatic temperature control of such a furnace represents quite a problem. It was considered the simplest solution to place two thermocouples right on the hearth, that is, in line with the work, the one couple being located at the far end of the slot and the other couple three feet closer to the burner. The two control valves were connected in series so that if either one of the couples reaches two high a temperature the gas to the upper part of the burner will be shut off, the gas for the raw gas blanket being constantly supplied at a definite rate.

This experimental slot forge furnace was installed in a large forge shop to test it under actual operating conditions. The possibility of eliminating scale has been conclusively demonstrated, also the tremendous heating rate of this furnace. Preliminary tests have shown that at least 150 pounds of steel can be heated per square foot of hearth area per hour. The importance of this can be realized when it is stated that the average heating rate of the ordinary type of forge furnaces varies from 100 to 120 pounds of steel per sq.ft. per hour. Due to repeated interruptions in the operation of the forge shop, due to part time operations, no conclusive results have yet been obtained regarding the efficiency of the furnace and the increase of the die life by virtue of the elimination of scale. Results up to date, however, are extremely encouraging and operations are about to start in another plant with a furnace built to include many improvements that experience has been able to point out.

Dr. Samuel W. Parr, Noted Chemist, Dies

DR. SAMUEL WILSON PARR, professor emeritus of practical chemistry in the University of Illinois, and the discoverer of illium, died May 16, at Champaign, Ill., of heart disease. He was seventy-four years old.

Dr. S. W. Parr

Dr. Parr a member of the American Gas Association, was recognized as America's leading authority on coal chemistry. His contributions to chemistry were many, including the discovery of illium, a substitute for platinum, which was named for the University of Illinois. He also perfected a process for the prevention of crystallization in boilers, which saved large sums of money for industrial organizations.

It was practical chemistry that appealed to him, and for a long while he served as a member of the Chemical Committee, Technical Section, American Gas Association. A great deal of his time was devoted to devising methods whereby chemical discoveries could be used for the benefit of humanity.

In recognition of his many discoveries, the Chandler medal was awarded to Dr. Parr in 1926 by Columbia University. He also received numerous honorary degrees. In addition to his research work he wrote several scientific books, which were regarded as authoritative. Among them were "The Chemical Examination of Water," "Fuel" and "Flue-Gases and Lubricants."

Dr. Parr was born in Granville, Ill., on January 21, 1857, the son of James Parr and Elizabeth Moore Parr. He was graduated from the University of Illinois in 1884, and received his Master of Science Degree from Cornell University in 1885. Later he studied in Berlin and Zurich.

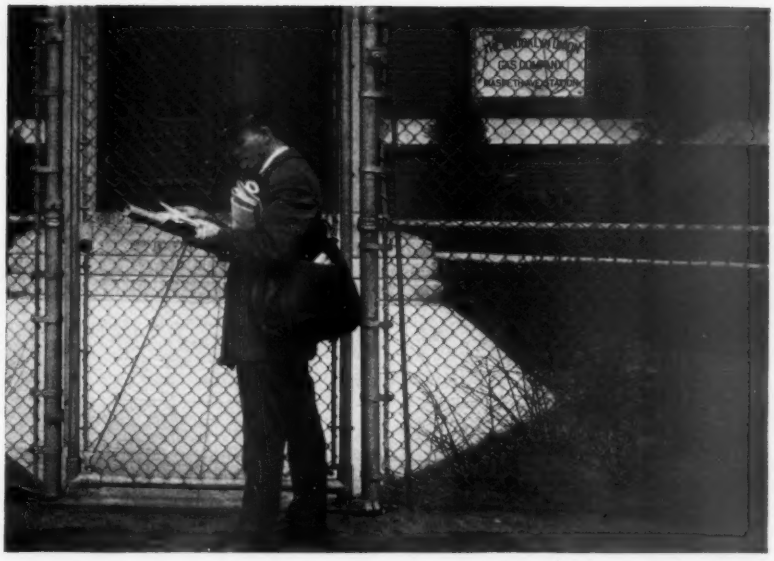
Dr. Parr began teaching in Illinois College in 1885. In 1891 he became professor of applied chemistry at the University of Illinois, and he held that position until his retirement.

He was director of the Illinois State Water Survey in 1904 and 1905, and was consulting chemist on coal investigation of the Illinois State Geological Survey in 1905. Besides being a member of the American Gas Association, he was a Fellow of the American Association for the Advancement of Science, former president of the American Chemical Society, and a member of other scientific organizations.

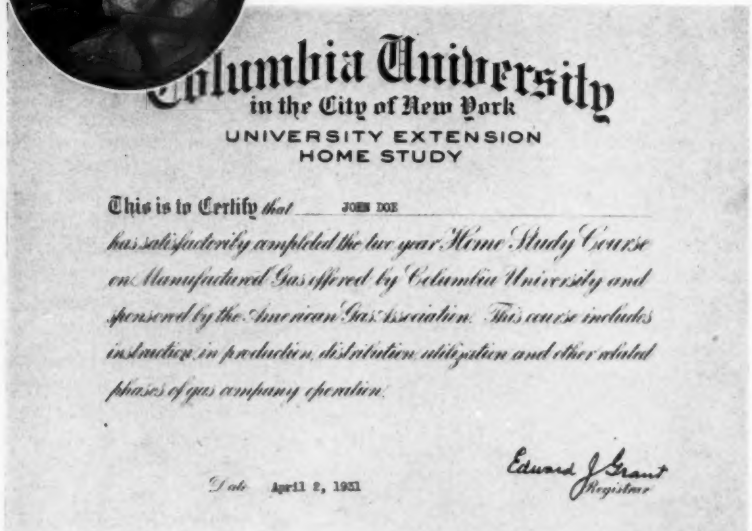
Bringing the University to the Student In the Gas Plant

SIX years ago the Home Study Course on Manufactured Gas, sponsored by the American Gas Association, was established at Columbia University. This course grew out of the activities of the Association Committee on Education of Gas Company Employees and has been described as an ideal cooperative arrangement between one of the country's leading educational institutions and the national organization of the gas industry. It furnishes technical instruction on all phases of gas company operation.

Since its inception 1,500 men representing gas companies all over the country have enrolled in the course. About 500 of these have finished the work and received their certificates. About 255 more are actively working on the lessons. The case of an individual student may serve to bring out better what the course is doing for the men in the gas industry.



The postman delivers mail to an employee of The Brooklyn Union Gas Company, Brooklyn, N. Y., who is enrolled in the Home Study Course on Manufactured Gas.



Columbia University
in the City of New York
UNIVERSITY EXTENSION
HOME STUDY

This is to Certify that JOHN DOE
has satisfactorily completed the two year Home Study Course on Manufactured Gas offered by Columbia University and sponsored by the American Gas Association. This course includes instruction in production, distribution, utilization and other related phases of gas company operation.

Date April 2, 1931

Edward J. Grant
Registrar

Facsimile of Certificate awarded Pupils Who Complete Course. Professor J. J. Morgan, insert, examining papers submitted by student.

John Doe was enrolled in the course early in June, 1929. He had a high school education followed by evening courses in chemistry, physics, mathematics, and an elementary course in gas technology. He had been employed by a gas company for several years.

Mr. Doe started work on his course at once, submitting the lessons regularly at the rate of about one lesson a month. During the first year in which he was enrolled he completed thirteen lessons. In August, 1930, in spite of the fact that his grades on the lessons had been uniformly high, he wrote regretting that conditions did not allow him to study the course as deeply as he would like and stated:

"It has held my interest from the beginning and has, to my mind, better fitted me for my position, revealing much of which the average gas employee knows nothing."

to which his instructor replied:

"I am glad to hear from you and to note that you have enjoyed the work of the course. I am sure you will find that a review of the material after you have completed the course will clear up many things that may have not been so clear when you

first studied them and will be very much worth while."

Continuing to submit lessons according to the regular schedule of about one lesson per month, John Doe submitted his final leson on March 16, 1931, at which time he wrote:

"It is truly with deep regret that I submit this, my final lesson. The personal touch and guidance in corrections and instructions lacked the cold contact of a correspondence course, as I have heretofore visualized it.

"I have spent many pleasant and profitable hours in study and I feel that the knowledge gained has enabled me to serve my company to a greater degree. The books and the lessons will always be kept and will serve as a reference in the future.

"In closing I wish to compliment you and your associates on the clear and concise manner in which you so ably compiled the data on the many phases and angles of the Manufactured Gas Industry and have presented it in the form of an instructive text book."

A facsimile of the certificate sent to him on the completion of the course is shown opposite together with a picture of Professor J. J. Morgan, Chemical Engineering Home Study Department at Columbia.

University of Illinois to Hold Short Course in Gas Engineering

THE University of Illinois, through the College of Engineering, in cooperation with the Illinois Gas Association, is offering the sixth short course in gas engineering, June 15 to 20, inclusive.

The object of this course is to present to those interested, the application of gas to domestic, commercial, and industrial heating.

The outline of the course, given in detail in the program below, will consist of lectures and problems in the principles and information necessary to enable the gas engineer to be conversant with the best practice in the application of gas to domestic, commercial and industrial heating.

A final examination in the various phases of the work of the course will be given, and the grade in this examination together with the grades obtained on the problems set for each lecture will be used as the basis of the report sent to each general manager of the gas company sending men to this course.

On account of the short time given to this course, all men attending are urged to report and register at 8 A.M., Monday, June 15, in Room 162, Chemistry Building. All lectures will be given in Room 112 Chemistry Annex.

Inquiries concerning the course should be addressed either to Dr. D. B. Keyes, Department of Chemistry, University of Illinois, Urbana, Illinois, or to Geo. A. Uhlmeyer, chairman, Peoples Power Company, Moline, Illinois.

Reservations have been made at the Urbana-Lincoln Hotel where excellent accommodations may be secured at favorable rates, and where the entire student body may have the opportunity of close association during the evening hours.

The program follows:

MONDAY, JUNE 15

8:00- 8:15 Registration, Room 162, Chemistry Building.

8:00-12:00 "Elements of Combustion and Combustion Calculations"—Dr. D. B. Keyes, Department of Chemistry, University of Illinois.

1:00- 5:00 "Mechanics of Change-over from Manufactured to Mixed or Natural Gas"—C. J. Levey, National Machine Works, Sheffield and North Ave., Chicago, Illinois.

TUESDAY, JUNE 16

8:00-10:00 "Furnace Efficiency and Distribution of Heat Loss"—Dr. D. B. Keyes, Department of Chemistry, University of Illinois.

10:00-12:00 "Insulation"—Professor A. P. Kratz, Department of Mechanical Engineering, University of Illinois.

1:00- 5:00 "Heat Treating and Forge Furnace Equipment with special Reference to Diffusion Burners"—J. A. Hepburn, Surface Combustion Company, Toledo, Ohio.

WEDNESDAY, JUNE 17

8:00-12:00 "Industrial Heating Equipment (both low and high temperature)"—W. A. Darrah, President, Continental Industrial Engineers, Inc., Chicago, Illinois.

1:00: 300 "Volume Water Heating with Gas"—C. H. Light, Peoples Gas Light and Coke Company, Chicago, Illinois.

3:00- 5:00 "Effects of Furnace Atmosphere"—J. A. Comstock, Metallurgist, Peoples Gas Light and Coke Company, Chicago, Illinois.

THURSDAY, JUNE 18

8:00-10:00 "Introduction to Fluid and Heat Flow Calculations"—Dr. D. B. Keyes, Department of Chemistry, University of Illinois.

10:00-12:00 "House Heating Estimating"—Professor A. P. Kratz, Department of Mechanical Engineering, University of Illinois.

1:00- 3:00 "Hotel and Restaurant Selling and Equipment"—T. J. Gallagher, Mgr., Hotel and Restaurant Division, Peoples Gas Light and Coke Company, Chicago, Illinois.

3:00- 5:00 "Gravity Warm Air Systems"—Prof. A. P. Kratz, Department of Mechanical Engineering, University of Illinois.

6:30 Banquet.—Urbana-Lincoln Hotel.

FRIDAY, JUNE 19

8:00-10:00 "Forced Circulating Heating Systems and Gas Unit Heaters"—R. A. Bell, Surface Combustion Company, Toledo, Ohio.

10:00-12:00 "Hot Water and Steam Heating Plants"—Major W. E. Stark, Research Engineer, Bryant Heater & Mfg. Co., Cleveland, Ohio.

1:00- 3:00 "The Economics of Selling Gas for House Heating"—E. J. Opal, Bryant Heater & Mfg. Co., Cleveland, Ohio.

3:00- 5:00 "Installation and Economics of Conversion Burner Equipment"—N. T. Branche, Research Engineer, Surface Combustion Company, Toledo, Ohio.

SATURDAY, JUNE 20

8:00-12:00 Review and Examinations—Dr. D. B. Keyes.

Hopkins Students Hear Gordon King

A. GORDON KING, service engineer, American Gas Association, addressed the students of the School of Engineering, The Johns Hopkins University, Baltimore, Maryland, April 29, on "Some Engineering and Economic Fundamentals of Today's Gas Industry."

The subject discussed by Mr. King was chosen from important technical matters as of particular interest to the senior and graduate students and faculty of the Engineering School.

Affiliated Association Activities

Oklahoma Utilities Association

THE eight annual Southwestern Gas Measurement Short Course was held at the University of Oklahoma, April 21-23. The registration, while slightly below that of a year ago, was regarded by those in charge of the project as a definite evidence of the value attached to this course by gas company executives. The attendance reached 371, the registration representing twenty-two states. Sixteen gas equipment manufacturers had gas measuring appliances on display with factory representatives present to demonstrate their structure and use.

Morning sessions were held in the auditorium of the College of Engineering. These were handled by members of the faculty and representatives of gas companies with engineers of equipment companies lecturing on fundamental principles. The afternoons were taken up with class work on special subjects as in former years. Analysis of the registration showed that only about one-third of those present attended former courses, which indicated the plan adopted by many companies of giving all their employees concerned a chance to profit by this educational opportunity.

E. J. Stephany, of Dallas, secretary of the Natural Gas Department, American Gas Association, was one of the speakers at the general session, April 21. He reviewed the history of natural gas development since 1917, indicating the great increase in the magnitude of the problem of gas measurement during that time. He pointed out that in the early years of the industry gas was sold on a flat rate basis. Then for a period it was measured only at the consumer's meter, but in recent years is measured at the well, in transportation, at the city gate and at the customer's premises. He explained the organization and scope of work of the American Gas Association, including that of the A. G. A. Testing Laboratory, at Cleveland, O., and mentioned conservation as a subject for intensive study. Natural gas produced during the first century of natural gas history in the United States ending in 1921, he said, was less than that produced during the past nine years.

On Wednesday night, April 22, a banquet afforded much pleasure to those attending the course. There were no speeches, the entire evening being given over to entertainment arranged by Professor W. H. Carson, director of the course.

B. L. Maulsby of the Oklahoma Natural Gas Corporation, Tulsa, succeeded C. B. Day of the Consolidated Gas Utilities Company, Blackwell, Okla., as chairman of the General Committee, and will head arrangements for the 1932 course.

Pennsylvania Gas Association

APPROXIMATELY 300 members attended the twenty-third annual meeting of the Pennsylvania Gas Association at Galen Hall, Wernersville, Pa., April 28, 29 and 30.

Southwestern Gas Measurement Short Course Committee, University of Oklahoma. Standing, left to right—A. J. Kerr, E. W. Rowland, R. D. Turner, B. L. Maulsby and J. H. Felgar, Dean of Engineering. Seated—E. F. McKay, W. R. McLaughlin, C. B. Day, Professor W. H. Carson and Eugene Metz. Several members are absent.

Edward G. Boyer, president of the association, presided at the meetings, which held the interest of all throughout.

The opening session began with a banquet, followed by a business meeting at which the following officers were elected for the ensuing year: president, H. Smyser Bair, York; first vice-president, L. W. Heath, Williamsport; second vice-president, Frank P. Duggan, Lewistown; third vice-president, H. H. Ganser, Norristown; secretary, Frank W. Lesley, York; treasurer, W. G. Sterrett, Jenkintown; managing director, A. B. Millar, Harrisburg.

The following were elected members of the Association's Council to serve three years: N. G. Reinicker, Allentown; H. H. Richmond, Philadelphia; N. B. Bertolette, Harrisburg; V. L. Crawford, Tyrone. Edward G. Boyer, past-president, becomes a member of Council, ex-officio.

L. C. Smith, assistant to managing director of the American Gas Association, reviewed the work the Association is doing, and the banquet was concluded with addresses by Conrad N. Lauer, president, Philadelphia Gas Works Company, and E. A. Hirschman, secretary, York Chamber of Commerce.

Mr. Lauer urged the full cooperation of gas companies with dealers, plumbers and contractors in the sale of appliances, while Mr. Hirschman, who made a fine inspirational talk, referred to the betterment in living conditions brought about by public utility service.

The day sessions were devoted to production, distribution, new business and accounting. Mr. Bair presided at the porduction meeting, W. G. B. Woodring, Allentown, at the distribution, A. S. Corson, Philadelphia, at the accounting and J. Ward Crankshaw, Allentown, at the new business session.

Among the speakers were Charles M. Sturkey, Lexington, N. C., who presented a paper on the production and distribution of butane gas; F. L. Lucker, New York City, discussed gas compression; C. C. Jones, Philadelphia, high pressure gas storage; A. F. Benson, Erie, metering high pressure gas; J. Calhoun Smith, Reading, special merchandise sales; F. R. Swanson, Norristown, customer contact; J. W. Mackie, Kingston, machine accounting; E. N. Keller, Philadelphia, order department practices; A. A. Edwaldsen, Washington, D. C., house heating; Ellwood Griest, Philadelphia, results obtained by a continuous industrial survey; T. F. Kennedy, New York City, meeting today's competition.

At a banquet the second evening, R. S. McBride, associate editor, American Gas Journal, gave a forecast of the gas business ten years hence which predicted enormous development of the industry,

and Dr. Calvin O. Althouse, Central High School, Philadelphia, who followed Mr. McBride, made a brilliant inspirational address.

Missouri Association of Public Utilities

A. E. Bettis

A. E. BETTIS, vice-president of the Kansas City (Mo.) Power & Light Co., was elected president of the Missouri Association of Public Utilities at the recent annual three-day State convention of the organization at Excelsior Springs, Mo. Because of illness, Mr. Bettis was not able to attend the convention.

The Missouri Association is composed of electric, water, gas and electric railway member companies. As this was the twenty-fifth annual convention of the organization, a silver anniversary celebration formed part of the program during which "old timers" related reminiscences of former annual gatherings.

The officers elected for the coming year were as follows:

President, A. E. Bettis, Kansas City, Mo., Kansas City Power & Light Co.; first vice-president, Fred Karr, St. Joseph, Mo., St. Joseph Gas Co.; second vice-president, Worth Bates, Lexington, Mo., Missouri Gas & Electric Service Co.; third vice-president, Powell C. Groner, Kansas City, Mo., Kansas City Public Service Co.; treasurer, Hermann Spoehrer, St. Louis, Mo., Union Electric Light & Power Co.; secretary, F. D. Beardslee, St. Louis, Mo.; assistant secretary, Jesse Blythe, Jefferson City, Mo.

Executive Committee: T. J. Strickler, Kansas City, Mo., Kansas City Gas Co.; Hermann Spoehrer, St. Louis, Mo., Union Electric Light & Power Co.; W. H. Henby, University City, Mo., St. Louis County Water Co.; W. H. Swift, Jr., Springfield, Mo., Springfield Gas & Electric Co.; D. W. Snyder, Jr., Kansas City, Mo., Missouri Power & Light Co.; Abe Vogel, Louisiana, Mo., East Missouri Power Co.; H. H. Kuhn, Kansas City, Mo., Kansas City Power & Light Co.; H. M. Patton, St. Louis, Mo., Union Electric Light & Power Co.

Conference of Utility Association Secretaries

THE Time and Place Committee of the Conference of Utility Association Secretaries has selected Milwaukee, Wis., as the place and November 30 and December 1 as the time for the 1931 gathering, according to A. G. Schroeder, secretary.

Convention Calendar

Institution of Gas Engineers,
London, England.
June 2, 3, and 4.

Canadian Gas Association,
Montreal, Quebec.
June 4 and 5.

German Gas & Water Association,
Breslau, Germany.
June 8, 9 and 10.

National Electric Light Association,
Atlantic City, N. J.
June 8 to 12.

Southern Gas Association,
Chattanooga, Tenn.
June 9, 10, and 11.

Advertising Federation,
New York, N. Y.
June 14 to 18.

A. G. A. Domestic Appliance Course,
Testing Laboratory,
Cleveland, Ohio.
June 15 to 20.

A. G. A. New England Sales Conference,
Hotel Griswold,
Eastern Point,
New London, Conn.
June 26 and 27.

Home Service Summer Course,
Columbia University,
New York, N. Y.
July 6 to 24.

Pacific Coast Gas Association,
San Francisco, Calif.
Aug. 31 to Sept. 5.

American Electric Railway Association,
Atlantic City, N. J.
September 26 to October 2.

American Gas Association,
Atlantic City, N. J.
October 12 to 16.

Nat'l Assn. of Railroad & Utilities Commissioners,
Richmond, Va.
October 20-23.

American Petroleum Institute,
Stevens Hotel,
Chicago, Ill.
Nov. 10 to 12.

Bituminous Coal Conference,
Pittsburgh, Pa.
November 16 to 21.

Utility Association Secretaries,
Milwaukee, Wis.
Nov. 30 and Dec. 1.

P. U. A. A. to Hear Talks on Economic Factors

ECONOMIC factors which cause the peaks and valleys in the chartered course of business will be the keynote topics at the twenty-seventh annual convention of the Advertising Federation of America to be held in New York, N. Y., June 14-18. Program subjects will have a bearing on current marketing and distribution problems which stand out sharply in the present period of industrial and business readjustment.

Management, sales and advertising executives to a total of several thousand will attend these sessions, which will be held in the Hotel Pennsylvania. Governor Franklin D. Roosevelt, C. M. Chester, Jr., president of General Foods Corporation; C. F. Kettering, vice-president of General Motors, and Bruce Barton, chairman of the board of Batten, Barton, Durstine & Osborn, Inc., will be speakers. Others will include Kenneth Collins, executive vice-president of R. H. Macy and Company, New York, former Senator George Wharton Pepper of Pennsylvania; Dr. Glenn Frank, president of the University of Wisconsin, Joseph H. Appel, John Wanamaker's Edwin R. Gruhl, vice-president of the North American Company and Miss Marion C. Taylor, president of the Fashion Guild.

Business and industry abroad will be represented at the convention. Heading the delegation from the German Section of the Continental Advertising Association will be Ulrich E. Meisel, advertising manager of the Horch Automobil-Worke in Berlin. France and England are also expected to send representatives to the meeting here.

Through their interest in the varied phases of advertising, many national organizations will take part in the convention sessions. One of these will be the Public Utilities Advertising Association.

A short address of welcome to the delegates probably will be made by Hon. George B. Cortelyou, president of the Consolidated Gas Company of New York.

Other items on the program include the following addresses:

"Cooperative Advertising Campaigns Between Utilities and Electrical Dealers and Plumbers," by Jay Barnes, New Orleans Public Service.

"Advertising and Its Relationship to the Changeover by Gas Companies from Artificial to Natural Gas," by Paul Renshaw, Memphis Power and Light Company.

"Public Utilities and Newspaper Ad-

vertising," by Owen Connor, Philadelphia Public Ledger.

"Utilization of Advertising and Dealer Helps by Utilities," by W. A. Bowe, General Electric Company, Schenectady, N. Y.

"Syndicated Advertising and Publication Services," by J. R. Pershall, Public Service Company of Northern Illinois.

"Advertising During Periods of Business Recovery," by Paul T. Cherington, J. Walter Thompson Company.

Chemical Society Plans Gas Program

FOR the next meeting of the American Chemical Society, which will be held at Buffalo, N. Y., from August 31 to September 4, the Gas and Fuel Division is planning the following program:

1. Joint Symposium on "The Utilization of Gaseous Hydrocarbons."

This will be a joint symposium of the Divisions of Petroleum, Industrial, and Gas and Fuel Chemistry. Dr. D. B. Keyes has accepted the chairmanship. Any suggestions relative to this joint symposium should be sent directly to Dr. D. B. Keyes, Department of Chemistry, University of Illinois, Urbana, Illinois.

2. General Papers on Gas and Fuel Chemistry.

It is thought that enough papers on various gas and fuel subjects should be received for two half-day sessions. Information about papers for the general program of the Gas and Fuel Division should be sent to O. O. Malleis, The Koppers Research Corporation, Koppers Building, Pittsburgh, Pennsylvania.

Mr. Reiff Addresses Students at Purdue

N. J. REIFF, of the American Gas Association Testing Laboratory, at Cleveland, Ohio, spoke before the senior home economics class of Purdue University, Lafayette, Ind., in April on the meaning of the A. G. A. seal of approval on gas appliances and discussed the design and operation of gas ranges and their accessories.

New Butane Producer in the East

INFORMATION has been received at A. G. A. Headquarters to the effect that the Atlantic Refining Co., beginning in June, will have butane available from its Philadelphia plant. As far as is known, this is the first of the eastern refineries to produce butane from sources other than natural gasoline.

The growing importance of butane as an industrial fuel has made the subject of the handling of butane one of the important topics of the National Fire Protection Association. The hazards of a fuel of such high volatility and low explosive limits are such that special precautions must be taken in storing it on or near industrial plants.

Columbia Course in Household Equipment Opens Next Month

THE American Gas Association for four years has cooperated with Columbia University, New York, N. Y. in a three weeks' course in gas equipment, and it will take place this year July 6-29. This is a part of the regular university summer session. Students enrolled may take the course without examination, and without credit. College matriculants may receive college credit by registering as regular students and passing the final examination.

The morning lectures will be conducted by Dr. C. J. Lynde, head of the household equipment department, assisted in the laboratory work by T. H. Schleuning, test engineer of the Consolidated Gas Company of New York.

Afternoon work is optional, programs being planned by the Home Service Committee for six afternoons which include visits to various home service departments around New York.

An outline of the program is as follows:

COURSES ON HOUSEHOLD APPLIANCES
OUTLINE OF COURSES

Topics

July 6. Household gas range. Adjustment of burners to proper flame and to prevent popping; the gas meter.
July 7. Gas range oven heat controls. Construction, use and adjustment of five controls.
July 8. Expansion and contraction in household appliances.
July 9. Household ranges for compressed gas, oil, coal, and gasoline.
July 10. Heat measurement.
July 13. Movement of heat in household appliances.
July 14. Ice refrigerators.
July 15. Electric refrigerators. Cooling air by electric power.
July 16. Gas refrigerators. Cooling air by burning gas.
July 17. Mechanical refrigerator thermostats and safety devices.
July 20. Refrigeration in general. Freezing by evaporating ether, alcohol and water; producing solid carbon dioxide or dry ice.
July 21. Freezing ice cream in mechanical refrigerators, freezing mixtures, pressure cooker.
July 22. Automatic gas water heaters.
July 23. House heating with coal, oil and gas. House thermostats.
July 24. Examination.

Students who wish laboratory work with household heat appliances should register also for Household Engineering.

Household Engineering—Practical tests of household heat appliances. 1 point. Professor C. J. Lynde. 10:30-12:20, July 6 to 24.

Laboratory work with: gas range top burners, oven and broiler burners, smooth top range burners, gas oven heat distribution, insulated gas oven, gas oven heat controls, compressed gas range, gas refrigerator, gas water heater, gas-heated clothes dryer, gas-heated ironer, gas house heaters, oil range burners with and without wicks, oil range oven, oil water heater, ice refrigerator, pressure cooker, fireless cooker, vacuum bottles, and gasoline stove burner.

AFTERNOON LECTURES

July 8, 2:30 to 4:20

"Recent Research in Cookery"—Dr. Victoria Carlsson, Room 206, Dodge Hall.

July 9, 2:30 to 4:20

"Lecture Demonstrations in Cookery"—Miss Shapleigh, Room 206, Dodge Hall.

July 10, 2:30 to 4:20

"Recent Research in Cookery"—Dr. Victoria Carlsson, Room 206, Dodge Hall.

July 14, 2:30 to 4:20

Visit to Home Service Department of the Public Service Electric and Gas Company, Newark, N. J. Business of Home Service and a lecture demonstration by Miss Ada Bessie Swann, director.

July 16, 2:30 to 4:20

Visit to Home Service Department of the Consolidated Gas Company of New York. Program of Home Service Work conducted by Miss Jane T. Wagner, director, and staff.

July 22, 2:30 to 4:20

Visit to Home Service Department of The Brooklyn Union Gas Company. Talk by Miss Ruth Soule, director, "Home Contacts." Talk by Henry Behrman, "Accident Prevention with Gas Appliances."

The registration days for the Summer Session are July 1, 2, and 3. Tuition is charged at the rate of $10 per point. In addition to the tuition fees, each student in the Summer Session must pay a university fee of $7. For registration after July 3 (July 27 at 4 P.M. for courses which begin on that day) there will be a late fee of $6, and full credit will not be given.

Columbia University in its Summer Session presents a wide offering of courses covering practically all fields of instruction. The complete *Summer Session Bulletin of Information* describing this work in detail and including information regarding requirements for degrees, credits, living accommodations, tuition, and other matters of interest to prospective students, may be had without charge on application to the Secretary of Columbia University, New York City.

Report on Steel Decarburization Ready For Distribution

THERE is now available the bulletin covering the results of two years' work at the University of Michigan, Department of Engineering Research on "The Surface Decarburization of Steel at Heat Treating Temperatures." This work, which was sponsored by the Committee on Industrial Gas Research of the American Gas Association, was a thorough investigation of the causes and possible cure of this troublesome condition which frequently interferes with the production of machined parts of the highest quality.

The decarburization of steel has been a source of considerable trouble in certain hardening operations in which maximum surface hardness is required. It has caused soft surfaces on steel the composition of which should produce great hardness, and has thus often been the cause of excessive wear and of the early failure of parts in certain kinds of service. Parts subject to much wear, such as gears, camshafts, and the like, and parts used for cutting, as twist drills, lathe tools, pliers, and other such parts, are in fact apt to be rendered practically worthless by the decarburization which occurs in the hardening operation if it has not already occurred in previous heating operations. Decarburization has been encountered in practically every type of furnace, although in some furnaces it is evidently due wholly to carelessness. When, for example, a cyanide pot causes decarburization, it is clearly due to the fact that the cyanide mixture has been neglected. In other instances the cause of decarburization is not so evident and it is often difficult to know what steps to take to eliminate it. There have been many cases in which the condition appears and disappears without any apparent reason and the cause remains a mystery.

The research upon which this bulletin is based was initiated at the University of Michigan by the Committee on Industrial Gas Research of the American Gas Association in August, 1928, in the hope that a systematic investigation of this troublesome phenomenon might lead to a better understanding of the cause of its appearance and to the discovery of a possible remedy.

The investigation proper was preceded by a review of the scientific literature on the subject. It was found that investigations have been made of the action of the gases, air, oxygen, hydrogen, carbon dioxide, steam, and nitrogen, by many qualified authorities. There has been, however, a very considerable lack of agreement as to the facts. Some of the findings are even contradictory. All of these gases have been reported to cause decarburization, and some of them, notably nitrogen and hydrogen, have also been reported not to cause decarburization. Furthermore there have been large differences of opinion as to the relative decarburizing action of these gases. The various studies of the influence of air on decarburization have been in fair agreement, although the temperature at which decarburization begins has been variously reported.

Because of this lack of agreement of results published in the literature, and also because it seemed desirable to discover the principles involved, it was decided to study first the influence on decarburization of steel of some of the gases found in the products of combustion of manufactured gas, and then the effect of changes of pressure, and the effect of rate of flow of the gases, and of the atmospheres to be found in a gas-fired furnace. It was hoped that the results of these studies would disclose the limitations of heating in a gas-fired furnace, and thus point the way to the elimination of decarburization in plain carbon steel as well as in some of the more common alloy steels.

The results obtained from the studies of the decarburization effect of pure gases and synthetic mixtures are given in detail and finally summarized in fourteen sections. Recommendations for the prevention or elimination of surface decarburization are given. These recommendations should prove to be of immediate value to every industrial gas engineer troubled with this phenomenon, and it is recommended that the bulletin be placed in every industrial gas department. The bulletin will also prove of value to the metallurgists of plants using industrial gas.

Copies may be secured at American Gas Association Headquarters, 420 Lexington Avenue, New York City, at a nominal charge.

Ohio Town Is Supplied With Gas from Balloons

USE of two 35,000 cubic foot racing balloons as emergency illuminating gas containers took place not so long ago when the East Ohio Gas Company replaced pipe lines near Ravenna, Ohio.

While changing over from old lines to new lines, it was necessary to shut off the city's gas supply and so the balloons were inflated with 35,000 cubic feet of gas in order that they might serve as a source of supply for the city. The balloons were filled directly from the gas lines by means of pipe laid in the form of a "Y" from the main gas lines to the balloons which were then inflated in the meadow some distance from the road along which the gas line was laid.

After the balloons had been inflated with the gas and the controlling valves on the lines were closed, it was possible to connect one of the balloons with a portable compressor which has a capacity of 220 cubic feet per minute.

Gas was then pumped from one balloon at a time and passed through the compresser into the main. In this way the consumers in Ravenna were safe-guarded against any decrease in their gas supply or even in the pressure of the gas.

To the best of the knowledge of its balloon room personnel the Goodyear Tire & Rubber Co., Inc., says that this is the first time that balloons have been used for the purpose of emergency gas supply system.

The operation was satisfactory to the East Ohio Gas Company, according to J. G. Hanks, general superintendent, Cleveland, and W. T. Hagan, also of Cleveland. R. W. Ramsdell, of the main line Department of the East Ohio Gas Company had charge of the operation.

The balloons were inflated and operated by Goodyear factory personnel in charge of J. F. Cooper, general foreman of the Goodyear balloon Department.

Natural Gas Men Hear Of Industry's Progress

By KEITH CLEVENGER

Director of Publicity and Advertising, American Gas Association

ONE thousand men and women gathered in Memphis, Tenn., on May 11 to attend the annual convention of the Natural Gas Department, American Gas Association, and for four days heard reports and discussions that emphasized the steadily increasing importance of this industry. From the moment the sessions began until adjournment took place on May 14, the convention bristled with the presentation of papers by prominent men in their fields. They uncovered facts and figures of vital importance to the future expansion and development of natural gas; they drew word pictures which spoke eloquently of the fact that today's ideal fuel likely will become the universal fuel of tomorrow.

Splendid tribute to the serious intent of the delegates as well as the merit of the program was evidenced by the fact that despite the constant availability of "true Southern hospitality" and entertaining divertisements for which the people of Memphis are noted, all sessions were well-attended and some meetings taxed the capacity of the large ball room of the Peabody hotel in which the sessions were held.

The opening formalities over, in which W. D. Kyser, president of the Memphis Power and Light Company, and Mayor Watkins Overton welcomed the visitors, R. W. Gallagher, president of the East Ohio Gas Company, Cleveland, Ohio, and vice-president of the American Gas Association, delivered the key-note address in which members of the natural gas industry were urged to enlighten fuel consumers concerning the proportion of fuel cost that is in effect indirect taxation.

"Under the head of uncontrollable items I would like to mention taxation," Mr. Gallagher said. "Most of us have come to believe that this is not only an uncontrollable expense, but a constantly increasing one. I sometimes wonder if this point of view is not the assumption why it is a fact.

"Taxation is certainly an important item in operating cost and one that is not susceptible to immediate reduction for the reason that it is put into the utilities' operating cost by outsiders.

"When times are prosperous, governments are liberal in spending. Unfortunately, however, during the depression, when every other business or individual must curtail the spending of money, public money is spent very often most wastefully and uneconomically and with little benefit to the general welfare.

"Public spending has become altogether too heavy a burden on private business, which brings us right back to the question, 'What are we in private business going to do about it?"

Mr. Gallagher suggested that it is the duty of gas companies to inform the public about the seriousness of the indirect tax situation.

"Should we not try to tell our consumers that taxes paid by the utility

Natural Gas Convention in Session at Hotel

are not paid by the stockholders of the company, but by the consumers of the utilities' product?" he asked. "In other words, tell the consumers that when they pay their utility bills, 10 per cent or whatever is the proper amount is a tax—an indirect tax.

"If each consumer of a utility product is told each time he pays for a thousand cubic feet of gas what portion of it is turned over to tax spending authorities, he will immediately become interested in trying to curtail the amount of money raised in this way."

In an address that was of absorbing human interest and a mixture of constructive criticism and information, Floyd W. Parsons, of New York, editorial director of *Gas-Age Record* and nationally-known economist and contributor to *The Saturday Evening Post* and other magazines, stressed the necessity for planning gas properties now for the business they must be prepared to handle ten years from now, when the United States' population will have increased by more than 17,000,000, when competition will be much keener, when there will be many more uses for gas than there now are, and envisioned the rapid and sure development of the natural gas business into a nation-wide inter-connecting system of pipe lines for the transportation of natural gas to all the important cities and industrial centers of the nation.

"The next ten years will be primarily a fuel era with natural gas as the young giant to watch and guide with care," Mr. Parsons declared.

"It is apparent that transformations of vital importance are under way in the basic field of mechanical energy and the trend toward the distribution of energy through wires and pipes over long distances will continue with increasing impetus. The merchandising of raw fuels to the individual consumer will become an economic impossibility due to the rigors of keen competition.

"We have here in the United States enormous markets for natural gas. It is wrong to assume that this gas must supplant the product now being manufactured from coal by our big utilities. It is bad to build long distance pipe lines without consumer markets having been first definitely established.

"There is no disposition among the eastern manufactured gas companies to prevent or hamper the construction of natural gas pipe lines into their industrial and domestic markets, but they do want the pipe line developments to be based on good engineering and sound economics. In fact, the manufactured gas companies are desirous of helping along the expansion of the markets for natural gas."

The development of natural gas statistics, the studies being made relative to rate structures and other problems incident to the changeover

"Cooling by Gas"

"The prediction of one of the experts in the distribution and use of natural gas that this resource will soon be used in the cooling as well as in the heating of homes and other structures is one among many interesting bits of knowledge dispensed by delegates to the convention of the American Gas Association now being held here. The outlook for more extended and beneficial uses of the nation's natural resources makes the conservation of these resources the much more imperative.

"At the local convention are hundreds of delegates, earnest, intelligent, industrious men who are not content to remain satisfied with present benefits accruing from nature's gifts. Through improved methods of production and distribution as through the perfection of natural resources in supplying new services and usefulness will a large contribution to the progress, prosperity and happiness of the world be made. Only the surface has been scratched of the possible services and comforts that will be provided for human beings in the days to come through proper appreciation of nature's gifts.

"At last men are beginning to understand that the greatest of all natural resources is the human brain."

—Memphis Commercial Appeal.

in Session at Hotel Peabody, Memphis, Tenn.

Report of Committee on Final Resolutions

SUCH a successful Convention as this is made possible only by the combined efforts and cooperation of many individuals and organizations. In this twenty-sixth national gathering of natural gas men, we have been fortunate to have such splendid assistance from so many sources. We are, therefore, pleased to offer the following resolution:

RESOLVED: THAT, we express the appreciation of the Convention to the many who have planned, worked for and assisted in arranging this meeting and the accompanying entertainment, particularly to W. J. O'Brien and the members of the General Arrangements Committee; to Mrs. W. D. Kyser and Mrs. W. J. O'Brien and the others who assisted on the Hostess Committee; to E. F. Schmidt and the members of the Program Committee; to Paul Renshaw and the Publicity Committee; to J. J. Brennan for his Hotels Committee; and to W. N. Ford for his Reception Committee. We also express our appreciation to W. D. Kyser and the many officials and employees of the Memphis Power and Light Company who assisted so freely and cheerfully; to the City of Memphis and his Honor, Mayor Watkins Overton; to the Convention Bureau of the Memphis Chamber of Commerce; to Chairman Cooper and his officers and committees; to Managing Director Forward and his able staff; to those who prepared and delivered addresses and papers and those who aided by their discussions; to the hotels and the press of Memphis; and to the others who have made this meeting so memorable to those in attendance by their willing and able assistance.

The Committee also offers the following resolution:

RESOLVED: THAT, this Convention commends the work of the Main Technical and Research Committee and extends its sincere thanks to the members of this committee and its subcommittees and that we pledge the support of the industry to the effective conservation of natural gas and the plans for research in this subject developed by the Main Technical and Research Committee with the active assistance of the Bureau of Mines.

RESOLVED: THAT, we heartily endorse the many research activities of the American Gas Association, its courses in employee training and all that is being done for the promotion and development of the gas industry to the end that it may serve to the fullest possible extent the best interest of the public.

Fallacies of Municipal Ownership

WHEREAS, the public welfare is menaced in some localities by ill-considered proposals for municipal ownership and operation of public utilities, and whereas, many, if not all of these movements, are inspired on the spur of the moment either by temporary conditions adversely affecting the gas industry or are the deliberate design of political groups who agitate the municipal ownership idea in order to create for themselves political issues. These movements generally are born out of the temporary distress of the people and have no sound economic basis nor are they justified by failure of the gas industry to adequately serve the public under regulation. Therefore, be it

RESOLVED, by the Natural Gas Department of the American Gas Association that it is and shall be the duty of the natural gas industry to warn the public of the hazards of municipal ownership, its economic fallacies, and its inherent inconsistency with the true principles of American citizenship. And further, that we pursue diligently and execute energetically a policy of informing the public on all the facts surrounding any specific proposal for municipal ownership, as well as continue with vigor the policy of giving the public all relevant facts concerning our own industry.

Publicize Tax Facts

WHEREAS, the constantly increasing burden of taxation upon all public utilities is in effect an indirect tax upon the consumers of the utilities product rather than upon the stockholders of these companies, and whereas the tendency to increase these taxes constitutes a growing burden upon all utility customers, as was so ably presented in the addresses and discussions before this convention.

BE IT RESOLVED, by the Natural Gas Department of the American Gas Association, that we commend to all member companies the suggestions that were made in this matter during the convention that they use their best efforts to give publicity and information to their respective customers in order that these customers may have full knowledge as to what proportion of their gas bill is in fact a tax and not a charge for the utility product.

(signed) H. C. Morris
M. W. Walsh
T. J. Strickler
H. J. Hoover

from manufactured to natural gas, the many projects in industrial research, the sales training and educational courses, the various advertising services, and the continual compilation of data for the benefit and use of company and individual members as well as the innumerable other activities, all coordinated and controlled under the Association's "five-year plan" program, were described and explained by Alexander Forward, New York, managing director of the American Gas Association.

Mr. Forward's address was elaborated upon by several men prominent among them being H. C. Abell, New York, former president of the Association and vice-president of Electric Bond and Share Company; Walter Beckjord, Boston, a director of the Association and vice-president of the Boston Consolidated Gas Company, and J. D. Creveling, New York, member of the managing committee of the Natural Gas Department and general manager of natural gas and gasoline operations of Cities Service Company.

B. H. Gardner, director of sales, Columbia Gas and Electric Company, Columbus, Ohio, delivered the only outright sales address of the convention, stating that "the outlook for the gas business has never been brighter than at the present time, and existing loads can be retained and future loads can be built up, provided the gas industry is alive to the advantages of its services and tells its story through active advertising and sales departments. In this battle for the cooking, water-heating and house-heating loads, the gas industry cannot assume an indifferent attitude. It must be the pacemaker in serving and protecting these existing markets for gas, as well as in developing new markets for refrigeration and space cooling."

A description of the newest field of activity for natural gas-house cooling and air conditioning, presented by E. D. Milener, research representative of the American Gas Association, was one of the outstanding addresses before the convention. "House cooling and summer air conditioning is definitely a function of natural gas," said Mr. Milener, "and is the first time that gas is used in a major operation

where it does not replace some other fuel."

"The Economic Value of Safety," presented by E. J. Sullivan safety director, Arkansas Natural Gas Corporation, Shreveport, supported the statement that "safety in industry is fast becoming a profitable operating activity" and that "a total of 85 per cent of all industrial mishaps in the natural gas business are caused by faulty supervision and only 15 per cent due to poor physical condition of the property."

A great amount of interest was evidenced in the report of the Wrinkle Committee, presented by H. J. Hoover, of Cincinnati, chairman. Under this award system the prizes for each of five divisions—production, transportation, distribution, office, and safety, $25 for the first, $10 for the second and $5 for the third, amount to a total of $200 each year. This year, in addition to the regular division prizes, a grand prize of $50 for the best wrinkle, regardless of the division to which it was applied, was offered by *Natural Gas*, the official publication of the Natural Gas Department. The following prizes were awarded:

GRAND PRIZE—$50.00

Offered by *Natural Gas Magazine*

Wrinkle No. 43

"Tunneling Auger," by W. M. Norton, Texas Cities Gas Company, Galveston, Texas.

TRANSMISSION SECTION:

FIRST PRIZE—$25.00

Wrinkle No. 29

"Piston Slide for Removing and Installing Piston of Snow Engines," by Wm. H. H. Ream, Ohio Fuel Gas Company, Sugar Grove, Ohio.

SECOND PRIZE—$10.00

Wrinkle No. 17

"Device for Holding Regulator Weights on Hanger." by H. D. Mahaffey, Ohio Fuel Gas Co., Columbus, Ohio.

THIRD PRIZE—$5.00

Wrinkle No. 37

"Automatic Differential Valve Lever," by M. E. Lake, Ohio Fuel Gas Company, Columbus, Ohio.

OFFICE SECTION:

FIRST PRIZE—$25.00

Wrinkle No. 5

"Office Paper Reference Slip," by R. W. Hitchman, United Fuel Gas Company, Charleston, W. Va.

Natural Gas Fellowships

IT seems desirable at this time to briefly review the history of the Natural Gas Fellowships and the educational opportunities offered through same to the Natural Gas Department.

In 1927 at the time of the merger of the Natural Gas Association of America with the American Gas Association, the Natural Gas Supply Men's Association, which had always been closely affiliated with the Natural Gas Association, dissolved and very generously turned over its assets, amounting to $17,000 to the American Gas Association with the understanding that the income would be used for educational purposes.

The Natural Gas Association also had a special fund of $10,000 invested in Liberty Bonds, which was added to this Educational Fund.

The earnings since have been added to the fund, so the principal now amounts to about $30,000.

The Committee on Natural Gas Supply Men's Fund was appointed by the Executive Board of the American Gas Association June 1, 1928, and was charged with the responsibility of determining the best means of applying the available income to the purposes intended.

After many meetings and considerable correspondence with colleges and universities in various parts of the country, in which the advice of these educators was sought and received, as well as that of practical gas men, your Committee arrived at a definite conclusion which was submitted to the Executive Committee and approved. It is that—

"The natural gas industry is in need of technical graduates who have studied those subjects most applicable to the problems of our industry and who have had some experience or contact with our operations. Our universities, generally speaking, lack the funds required to promote research into natural gas subjects or to aid those worthy students who would like to spend more time in natural gas research, but who cannot afford to invest more of their own money in further study and research after their graduation. Our educational fund fits happily into this picture.

"While we are of the opinion that the greatest good can be accomplished by graduate aid through research fellowships, it may be necessary to give assistance to worthy juniors or seniors which will help them to graduate from the regular engineering courses and to then undertake the special researh work.

"In order to obtain the greatest and most effective results, we have agreed that the distribution of our funds should be limited to two schools."

The University of Oklahoma has been selected to represent the Western Section and the West Virginia University to represent the Eastern Section.

Students who have graduated in Mechanical Mining, Civil and Petroleum Engineering, Chemistry, Geology or Physics will be eligible for the Fellowships, if the courses they have taken have given them sufficient ground work in natural gas subjects.

All engineering graduates of any school are eligible regardless of the year in which they have graduated, but all things being equal it is planned to give preference to dependents of gas company employees or men already in the gas industry.

Since the second year of research is usually much more productive than the first year, it is thought that the requirements in the case of Natural Gas Fellowships should be for two years of post-graduate work.

The course of study and the research work to be performed should qualify these students for a Master's or Doctor's Degree in Engineering with particular reference to Natural Gas Technology, and the industry is in need of such graduates. Already one of the universities selected has advised your committee of the addition to their staff of two excellent men, both of whom have had long experience in the field of combustion and utilization of natural gas. While no definite problem or set of problems for research by the Natural Gas Fellow has been established, it is thought necessary to keep this matter very flexible at all times. There are very many pertinent and extremely important problems in the industry, research on which can be taken up as the facilities of the universities permit.

The income from the fund allows for each Fellowship sufficient to pay all tuition charges (the major part of which have been remitted by the universities), books, and other expenses including a reasonable amount for room and board.

In conclusion let us give emphasis to the opportunity now offered in these fine educational institutions and the preference offered to gas company employees or sons of gas company employees who definitely plan on going into the natural gas field for their life work.

Application blanks can be procured from the Office of the Secretary of the Natural Gas Department, American Gas Association, Dallas, Texas, and the selections based on qualifications will be made by the Committee and a representative of each university. It is important that candidates for these Fellowships submit their applications not later than the middle or end of June of this year, in order that the selection can be made by the Committee and the School Authorities consulted in time to have the courses at both Schools start with the beginning of their Fall Terms next September.

Respectfully submitted,

(signed) S. W. Meals
J. D. Creveling
J. B. Tonkin, Chairman.

SECOND PRIZE—$10.00

Wrinkle No. 12

"Record Form of Shut in Leakage Tests," by A. M. Hutchinson, Ohio Fuel Gas Company, Columbus, Ohio.

THIRD PRIZE—$5.00

Wrinkle No. 21

"Publicity Folder on Gas Appliance Show," by G. W. Harr, Monongahela West Penn Public Service Company, Fairmont, W. Va.

DISTRIBUTION SECTION

FIRST PRIZE—$25.00

Wrinkle No. 42

"Water Seal on Vent of Service Regulator," by J. W. Martin, Municipal Gas Company, Dallas, Texas.

SECOND PRIZE—$10.00

Wrinkle No. 1

"Installation of Large Gas Meters Set in Multiple," by W. Musgrave Wood, Kansas City Gas Company, Kansas City, Missouri.

THIRD PRIZE—$5.00

Wrinkle No. 2

"New Design of Seal Pot," by W. Musgrave Wood, Kansas City Gas Company, Kansas City, Missouri.

PRODUCTION SECTION

FIRST PRIZE—$25.00

Wrinkle No. 59

"Improved Method of Connecting Wells," by Turner L. Pitt, Lone Star Gas Company, Petrolia, Texas.

SECOND PRIZE—$10.00

Wrinkle No. 32

"An Ideal Connection for Collecting Gas Samples," by Dwight H. Talbott, Ohio Fuel Gas Company, Lancaster, Ohio.

THIRD PRIZE—$5.00

Wrinkle No. 38

"Improved Hub and Penn Lifter for Pressure and Volume Gauges," by M. E. Lake, Ohio Fuel Gas Company, Columbus, Ohio.

SAFETY SECTION

FIRST PRIZE—$25.00

Wrinkle No. 45

"Non-Skid Device for Ladder," by H. C. Wells, Lone Star Gas Company, Petrolia, Texas.

SECOND PRIZE—$10.00

Wrinkle No. 22

"Safety Plub Clamp," by W. M. Henderson, Los Angeles Gas and Electric Corporation, Los Angeles, California.

THIRD PRIZE—$5.00

Wrinkle No. 39

"Safety Alarm Switch," by Joe Phillips, Lone Star Gas Company, Petrolia, Texas.

"Compression and Transmission of Natural Gas," presented by P. McDonald Biddison, Southern Natural Gas Corporation of Birmingham, Alabama, in which the more recent developments in this rapidly growing department of the business, as well as interesting predictions of future developments were given, brought forth most active discussion, as did the presentation of the report of the activities of the Main Technical and Research Committee, under the leadership of H. D. Hancock, natural gas consulting engineer for Cities Service Company, New York. These reports were presented as follows: "Gas Measurement," by H. S. Bean, United States Bureau of Standards, Washington, D. C., "Pipeline Flow," W. B. Berwald, United States Bureau of Mines, Bartlesville, Oklahoma and "Gas Well Deliveries," by E. L. Rawlins, also of the Bureau of Mines, Bartlesville. Aiding in the illumination of these reports were the discussions of Max Watson, of Amarillo, Texas, and Bernard "Barney" Oakland, of Monroe, Louisiana.

A drilling symposium, lead by J. French Robinson, Hope Natural Gas Company, Pittsburgh, representing the eastern fields, J. A. McDowell, United Gas Public Service Co., Houston, representing the mid-continent and L. M. Spencer, Southern California Gas Co., Los Angeles, representing the Pacific Coast, and a symposium on production problems presented by J. D. Sisler, Morgantown, W. Va., State Geologist of West Virginia, representing the east, R. M. Stuntz, Cities Service Gas Co., Bartlesville, Oklahoma, for the mid-continent field and Wm. Moeller, Jr., Southern California Gas Company, Los Angeles, representing the Pacific Coast featured the morning programs Wednesday and Thursday, May 13 and 14.

An interesting and instructive paper on "Detection and Prevention of Distribution System Leakage," was presented jointly by J. A. Martin and L. B. Denning, Jr., of the Lone Star Gas Company, Dallas, Texas. "The Origin of Dust and Its Elimination," was the subject of a paper by D. A. Sillers, Lone Star Gas Company, Dallas. "Modernism in Distribution Design and Operation," was the subject of a discussion led by G. J. Heckendorn, Public Service Company of Colorado, Denver, John C. Diehl, Metric Metal Works, Erie, Pa., gave a paper on "Field Testing of Large Positive Meters," and J. B. LeBow, of United Gas Public Service Company, Houston, the paper on "A Uniform Classification of Accounts."

These subjects, together with the report of the Natural Gas Fellowship Committee, and, in the absence of the chairman, John B. Tonkin, Pittsburgh, was read by E. J. Stephany, secretary of the Natural Gas Department, and the final resolution of the convention, brought this most important and interesting convention of natural gas men to a close.

The arrival of the first delegates in Memphis was the signal for the men and the women of the Memphis Power and Light Company, the Memphis Natural Gas Company, the Memphis Chamber of Commerce and for every entertainment and hospitality resources of the city to be marshalled into action. Under the leadership of W. J. O'Brien, general manager of the local utility, and his captains, J. J. Brennan, W. N. Ford, Paul Renshaw, W. A. Dunkley, and others, assisted by D. C. Shaffer, president of the Memphis Natural Gas Company, plans for the entertainment of the convention had been worked out in advance, and too much credit for the smooth-working efficiency and effectiveness of every detail cannot be given those Memphis utility people. The entertainment of the women attending the convention was likewise ably planned and executed by a committee headed jointly by Mrs. W. D. Kyser and Mrs. W. J. O'Brien. In no other way could the following schedule of social and entertainment events have been so successfully combined with an already crowded business program.

Old-fashioned southern barbecues, spit-roasted meats and everything that goes with 'em, in the shade of Tennessee maples and accompanied by the music of the famous Memphis "Pullman Porter Blues" jazz band and quartet, sight-seeing trips, golf at four of Tennessee's finest country clubs, a wrestling match for the men and a theater party made the opening day one long to be remembered.

Personal and Otherwise

F. R. Bacon

Frank R. Bacon has been elected president of Cutler-Hammer Inc., Milwaukee, Wis., to fill the vacancy caused by the death of Beverly L. Worden. Mr. Bacon formerly held the office of chairman of the board which has been abolished.

G. W. Nickels has been elected president of The Twin Oil and Gas Company, New Philadelphia, Ohio.

E. M. Lindsey has been appointed general manager of Natural Gas Corporation of California with offices in San Francisco, Calif. Mr. Lindsey was affiliated with the Florida Power Corp. before going to the Pacific Coast.

E. M. Lindsey

Herbert L. Morris was recently elected president of the Lawrence Gas and Electric Company Associates, Lawrence, Mass.

Charles E. Bennett, vice-president and general manager of the Binghamton Gas Works, and vice-president and general manager of all Columbia Gas and Electric Company properties in New York state, has been named president of both corporations.

William A. Hannan, construction supervisor for the Newburgh district of the Central Hudson Gas and Electric Corporation, has completed forty years of service with the company and its predecessors.

George E. Sloats, superintendent of plants for the Southern Indiana Gas and Electric Company, Evansville, Ind., for 28 years, has retired.

J. F. Owens was elected president of the Oklahoma Gas and Electric Company at a recent meeting of the board of directors held in Oklahoma City.

Ray A. Siegrist has succeeded Gail Atkinson as manager of the Coshocton, Ohio, office of the Ohio Fuel Gas Company.

R. L. McCuen has been made superintendent in charge of operations for the Georgia Public Utilities Company, Augusta, Ga. Mr. McCuen was formerly with the Macon Gas Light Company.

J. A. Weston, assistant to the vice-president of the Detroit-Michigan Stove Company, Detroit, Mich. will retire from active duty on July 1. He has been with that company for thirty-five years.

Frank H. Brooks, president of the Iowa-Nebraska Light and Power Company, has been appointed general manager of the Northern Natural Gas Company and president of its operating subsidiary, the Missouri Valley Pipe Line Company.

Harry L. Farrar has resigned from the Western United Gas and Electric Company, Aurora, Ill., to become affiliated with the Standard Management and Operating Corp., a subsidiary of the Standard Oil Company of California.

H. L. Farrar

Alden Chester has resigned as general sales manager of the Chambers Manufacturing Company, Shelbyville, Ind., to become vice-president of the Globe American Corp. of Kokomo, Ind., where he will have charge of the gas range division.

A. A. Holland, formerly vice-president in charge of operations of Lago Oil and Transport Company in Venezuela, has been elected president of the newly-formed General Natural Gas Corp., which will operate in West Virginia and Pennsylvania.

Frank R. Philips has been elected president of the Philadelphia Company, a subsidiary of Standard Gas and Electric Company.

L. D. Spragle, division manager in New Albany, Ind., for the Public Service Company of Indiana, has retired from active service. G. H. Barr, formerly assistant division manager, succeeds Captain Spragle.

Henry E. Riggs has established an office at 527 East Liberty St., Ann Arbor, Mich., and will practice engineering, devoting particular attention to railroad and public utility regulation.

C. L. Brockschmidt has accepted a position as industrial gas sales and service engineer with the Mississippi River Fuel Corp., at St. Louis, Mo.

William A. Roberts has taken over the management of the coke sales department of the Preston Coal and Coke Company, Lowell, Mass. Mr. Roberts was formerly associated with the Lowell Gas Light Company.

C. A. Dow, who recently resigned the Sheridan, Wyo., managership of the Northwest States Utilities Company, has entered the service of the North Central Gas Company, a subsidiary of the New York Oil Company, with headquarters at Douglas, Wyo.

Robert B. Ingles, formerly associated with the American Commonwealth Power Corp., has been made sales manager for the Georgia Public Utilities Company, Augusta, Ga.

Richard Shepard, superintendent of pavements and permits, Consolidated Gas Company of New York, was given a testimonial luncheon on the fiftieth anniversary of his employment with the company.

Erwin A. Froyd, state senator of Wyoming and formerly employed by the Midwest Refinery Company, has been appointed manager of the North Central Gas Company, Torrington, Wyo.

William M. Large, district manager of the Interstate Public Service Company, Connersville, Ind., has resigned to take charge of the properties of the Northern Indiana Public Service Company in Huntington, Ind.

Al Parr as been appointed office manager of the Ashland, Ore., branch of the Southern Oregon Gas Corp.

James H. Erwin has been named superintendent of the Rockford, Ill., gas plant of the Central Illinois Electric and Gas Company.

R. R. Wagner has been appointed assistant superintendent of the Knoxville (Tenn.) Gas Company, succeeding A. H. Mills, who has been transferred.

H. Coleman Moore, Jr., assistant comptroller of the Associated Gas and Electric Company system, Ithaca, N. Y., has been named treasurer of the New England Gas and Electric Association with offices in Cambridge, Mass. He succeeds the late DeWitt Clinton.

Ralph Houch has been appointed superintendent of the Newport Gas Light Company, Newport, R. I., to fill the vacancy caused by the promotion of E. V. Howe to vice-president of that company.

Testing Laboratory
R. M. CONNER, Director
MANAGING COMMITTEE
J. S. DEHART, JR., Chairman N. T. SELLMAN, Secretary

A. G. A. Issues New Specifications for Gas Appliances

AMERICAN GAS ASSOCIATION Requirements for Installation of Conversion Burners in House and Water Heating Appliances were recently released by the A. G. A. Approval Requirements Committee for publication in their tentative form. They were printed early in May and mailed to all members of the Association for criticisms and suggestions. Due to the many angles involved in the drafting of these requirements a large amount of deliberation and discussion as well as considerable research were entailed in their preparation.

The Association and the gas industry as a whole owe much to the committees preparing these requirements and especially to the members of the subcommittee who have given so generously of their time for this work during the past year. These specifications are intended to serve as a guide to installation men and if carefully followed should do much to insure satisfaction on the part of the consumer in the use of gas for heating purposes.

Revisions to the Gas Range Requirements for 1931, as recommended by the Gas Range Sub-Committee and the A. G. A. Approval Requirements Committee were also printed and mailed to all association members during May. There are not only a large number of important revisions recommended in the present gas range specification, but for the first time approval requirements for gas ranges designed to be used on propane gas and butane-air gas have been drafted and recommended for adoption. After the recommendations of the members of the industry have been received and passed upon by the Association committees, the revised range requirements will then be printed in their final form. It is expected that the revised specifications for ranges will be ready for distribution late in the Summer.

The revisions which were made to the present range requirements and the preparation of the specifications for ranges to be used on propane and butane-air gases, made it necessary for the Laboratory to purchase considerable additional equipment and required a large amount of research which extended over a period of several months.

A great deal of research was also conducted by the Bureau of Standards in assisting with the development of new range specifications. Outstanding among the investigations made at the Bureau in this connection was the development of a method for the determination of the corrosion resistance of oven lining materials.

The A. G. A. Laboratory research associate, who is located at the Bureau, with the assistance of the Bureau Staff, developed a corrosion testing machine which will be used in making future tests of oven linings for corrosion resistance. The continued support and cooperation of the United States Bureau of Standards and Bureau of Mines, as well as other governmental bodies, in the development of equitable standards for domestic gas appliances is most gratifying to the Laboratory staff. The support and cooperation of gas companies and manufacturers, and the diligent and conscientious efforts of committee members who devoted a large amount of time and effort in the preparation of these requirements deserve the commendation of the entire gas industry.

In addition to the above, the revised requirements for incinerators were printed in their final form and distributed to the industry during the past month.

The preparation of new requirements and the revisions to existing ones, which tend to raise the standards of construction and performance of gas appliances, are indicative of the spirit and progress of the gas industry in an endeavor to improve the service rendered to its millions of customers.

J. A. Mayers Passes Away at Maryland Home

J. ALEXANDER MAYERS, 61 years old, vice-president of the Cumberland and Allegheny Gas Company, subsidiary of the Columbia Gas and Electric Company died suddenly April 24, of heart disease, at his home in Cumberland, Md.

A native of Barbadoes, British West Indies, and a graduate of Phillips Andover Academy, he became associated with the gas industry in 1893. He had been an engineer with the United States Army at Burlington, Vt. He became connected consecutively with the Lexington Avenue Cable Railway Company, East River Gas Company and Long Branch Gas Company, New York, and gas corporations in Columbus, Ohio, and Detroit.

Later he entered the engineering and construction business in New York and founded The Natural Gas Journal. In 1910 he built the gas plant at Key West, Fla., and in 1912 a plant in Porto Rico. He visited Argentina in 1915 to investigate gas properties.

He later built a potash plant in Buffalo, N. Y. Soon after he established the Equipment Exchange in New York. He was associated with the Public Service Construction Company and with the Southern Gas and Power Company in Philadelphia.

Mr. Mayers was a member of the American Gas Association, Engineers' Club and Lotos Club in New York, and Delta Kappa Epsilon, and the Maryland Utilities Association. He also was a member of the managing committee of the Publicity and Advertising Section, American Gas Association.

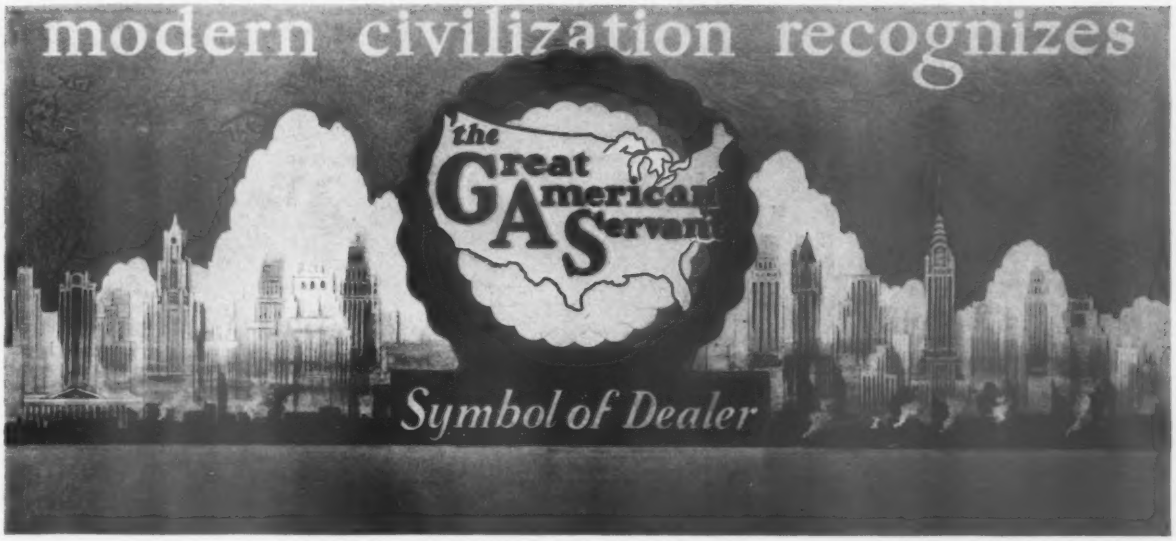
He was married three times and a child by each marriage survives.

His brothers, the Rev. W. Herbert Mayers, Collinsville, Conn., and the Rev. D. Campbell Mayers, Middleburg, Va., assisted in the funeral service at Grace Protestant Episcopal Church, Casanova, Va.

Publicity and Advertising Section

DONALD M. MACKIE, Chairman ALLYN B. TUNIS, Secretary WILLIAM H. HODGE, Vice-Chairman

Brooklyn to Try-Out Progressive Dealer Cooperation Plan



One of series of outdoor advertisements scheduled by The Brooklyn Union Gas Co., Brooklyn, N. Y.

BILLBOARDS at 156 locations in Brooklyn and Queens for an entire year, starting July 1, will broadcast a message on "Gas, the Great American Servant" to the residents of these two great home boroughs of New York City in the greatest outdoor advertising campaign ever undertaken in the gas industry.

A different message will be carried each month on the billboards. Each will call public attention to the "Great American Servant" symbol, the sign displayed by the dealer handling only gas appliances approved by the American Gas Association.

Newspaper and direct mail advertising will supplement the outdoor advertising. Space in newspapers will describe the program to be carried out. The direct mail will consist of a folder sent out each month with the regular bills. This folder will carry a reproduction of the poster appearing on the billboards that month. It will also tell the part played in the community by the selected dealer of approved gas appliances.

The campaign has as a fundamental purpose the promotion of the dealer in the merchandising field. This is convincingly brought forth in the first of the series of twelve advertisements. In

By HUGH H. CUTHRELL, Manager,

New Business Department, The Brooklyn Union Gas Company

this first billbroad a searchlight is shown playing on the symbol. It also carries the message: "Symbol of dealer selling approved gas appliances."

The same concentration on the symbol as the link between the gas company and the dealer selling approved gas appliances is emphasized in the second and third posters. The first three have been designed to familiarize the public with the color and the appearance of the "Great American Servant" symbol and what it stands for.

In the next four posters the specific means by which gas serves as the Great American Servant are emphasized. The billboards, all of which carry the symbol, stress the four major uses of gas in the home—for water heating, cooking, refrigerating and house heating.

While these seven emphasize the dealer in connection with the symbol and the use of gas, the next two place particular stress on the importance of the dealer as a merchandiser of approved gas appliances. This is expected to make the consumer realize that the dealer who displays this symbol is reliable and is a decided asset to the community.

The next three posters work this campaign up to a climax. Each one continues to link up the symbol as the mark of a dealer selling approved gas appliances. In addition the tenth poster pictures the public interest and acceptance of the symbol and its mission. The eleventh, which is reproduced herewith, calls attention to the importance of gas and of approved gas appliances in our modern scheme of things.

The final poster which is entitled "Gas Service for Me!", shows a housewife standing beside the sign, "Great American Servant, Symbol of Dealer." Beside the sign are the words "Symbol of dealer selling approved gas appliances."

Throughout the campaign this motto, "Symbol of dealer selling approved gas appliances," is repeated constantly with a view to fixing in the public mind as a demonstrated truth the fact that dealers displaying the symbol are selling only gas appliances approved by the American Gas Association. This assures protection to the public from faulty or inferior appliances.

Accounting Section

J. I. BLANCHFIELD, Chairman H. W. HARTMAN, Secretary WILLIAM A. DOERING, Vice-Chairman

More than 300 Attend Conference

By H. W. HARTMAN

GEORGE F. MITCHELL, president of The Peoples Gas Light and Coke Company, welcoming the delegates to the Third Annual Accounting Section Conference, held at Chicago, April 23-24, paid a tribute to the value of such meetings, and their importance to the continued welfare of the gas industry. The fact that the attendance, which exceeded 300, was greater than the year before and many new faces appeared in the audience was an ample and practical second to Mr. Mitchell's tribute.

One of the outstanding features of the Conference was the success attending the report of the "Committee on What Would You Do?" of which C. J. Fue, of The Brooklyn Union Gas Company, was chairman. This consisted of a series of questions which were first discussed by the meeting, after which the answer agreed upon by the committee was read and in some cases further discussed.

So many members suggested the continuation of this committee's activity that the committee has seen fit to address to the membership a statement calling for their suggestions, which is printed at the end of this article.

Due to the unavoidable absence of the chairman, J. I. Blanchfield, the conference was presided over by W. A. Doering, vice-chairman of the section. Mr. Doering, in his opening remarks, reviewed the matters to be considered, and stressed the importance of the round-table luncheon conferences arranged for the first day. These luncheon conferences proved to be a great success; 112 members attending, seated at nine tables arranged for the discussion of the following subjects:

"Meter Reading," "Credits and Collections," "Customers' Bookkeeping," "Customer Relations," "Mechanical Equipment," "Stores Accounting," "Payroll Accounting," "Financial Statements," and "Employee Training."

Reports of the captains in charge of the various tables were enthusiastic as to the interest shown, and the beneficial effect of the luncheon discussions in broadening the acquaintance of those in attendance and affording an opportunity to be heard far beyond the possibilities of either a conference or a convention session. In the absence of M. E. Brown, due to illness, H. C. Cliff handled the arrangements for the luncheon.

Good discussion was had on the paper presented by Paul Ryan, "Some Recent Trends in Gas Rate Structures"; and the paper by Frank L. Griffith, "Problems Involved in Changing from Volumetric to the Therm Basis of Billing."

The "Customer Relations Session," on Thursday afternoon, was a distinct contribution to this subject in the matter of the papers presented by R. F. Bonsall, Paul Renshaw, B. S. Watson and H. R. Halsey. An enthusiastic discussion was had of the A. G. A. Course on Employee Customer Relations, including a tribute to the great success of the course by representatives of the Milwaukee Gas Light Company, the Detroit City Gas Company, Consolidated Gas Company of New York, Public Service Electric and Gas Company, Consolidated Gas Electric Light and Power Company of Baltimore, and several others.

The film, "The Story of Natural Gas," proved most interesting and informative on the difficulties necessary to overcome in bringing this valuable product from the wells to the consumer.

The Friday afternoon session was largely taken up with progress reports of the Insurance Committee, Committee on Coding of Materials, Supplies and Merchandise, and the Committee on Standard Departmental Financial and Cost Statements. An interesting paper was presented by J. E. Kane, of the Consolidated Gas Electric Light and Power Company, on the "Application of Retail Inventory Methods to Public Utility Merchandise Accounting."

The Conference was closed with a summary presented by W. A. Sauer, vice-president of the Midland United Company, Chicago, which emphasized the importance and lessons to be drawn from the various subjects discussed.

The following tribute was paid to the late DeWitt Clinton by motion of H. M. Brundage:

> "We record, with deep sorrow, the death on Saturday, March 28, 1931, of Mr. DeWitt Clinton, an active member of the Accounting Section of the American Gas Association for many years, and one of its past chairmen.
>
> "Mr. Clinton was born in Waterbury, Connecticut, and was in his sixtieth year. He came from a long line of ancestors whose contributions to the development of the Nation's resources were notable. The greater part of his business life was devoted to the utility industry, the center of his activities being in Worcester, and during more recent years, in Cambridge, Massachusetts. While exceptionally active

View of the Accounting Conference in Session at Chicago, April 23-24

in his chosen field, he made time to prominently identify himself with many other commercial, civic and religious efforts. He was a Director of one of the Worcester Banks, Treasurer of the Y. M. C. A. and a member of the Episcopal Church.

"During the years of his membership in this Section he was ever a leader. His wise counsel, sound judgment and happy faculty of expression were strong factors in its progress and development, while his genial presence and gracious smile endeared him to his associates in a marked degree.

"His passing leaves a vacancy which will be difficult to fill and his absence creates a void which time alone can heal. Although actively engaged in business undertakings, he nevertheless cultivated a taste for the best in literature, art and music. Living in a so-called skeptical age, he was deeply religious. Carrying a full share of responsibility, he was ever alert to lend a sympathetic ear. With a variety of interests, he yet remained "master of his days, living quietly, knowing peace."

"BE IT ORDERED That a copy of this minute be sent to Mrs. Clinton with the assurance to her and the members of her family of our deep sympathy in their bereavement."

Following is the letter sent by the "Committee on What Would You Do?" to the membership:

"The What Would You Do? Committee expresses its appreciation of the reception and support given to its presentation by members of the Accounting Section in attendance at the Spring Conference in Chicago.

"And on the basis of this encouraging response the Committee is prompted to suggest its belief that only the surface has been scratched of the possibilities that may be developed out of the question-discussion idea. A study of the material in hand and of the material in prospect which without doubt can be made available, brings the conclusion that an extension of the idea promises not only to increase interest but to promote worthwhile discussion of many vital accounting theories and problems.

"The success of any such idea is, obviously, wholly dependent upon the cooperative response of all members of the Accounting Section, and, if for no other reason, such response is to be encouraged because of the practical benefit it brings to every cooperating and participating member.

"The Committee, therefore, desires and will welcome suggestions both of material for future use and of ideas which in any manner may tend to develop the wider discussion of that material.

"An expression of the opinion of all members of the Accounting Section is invited on the following:

"(a) Would a wider discussion be made possible if the questions to be presented at a session were reproduced and mailed to members before that session?

"(b) Would interest in the discussion of questions be increased if both the questions and the answers (as decided upon by the Committee) were mailed to members before a session?

"(c) In your opinion, is the question-discussion idea of sufficient interest to warrant an entire morning or afternoon session?

"(d) What suggestions do you wish to offer regarding the continuance and development of the question-discussion idea?

"We repeat that accounting questions and problems and ideas concerning the proposition will be most welcome, the response determining what further action shall be taken in regard to continuing presentations by a What Would You Do? Committee."

R. R. Young, Pioneer Salesman, Dies in New York

R. R. Young

RICHARD R. YOUNG, vice-president in charge of sales, Public Service and Gas Company, Newark, N. J., died April 30 in Roosevelt Hospital, New York, N. Y., after an illness of several weeks. He lived in Newark.

Born in 1866 in Forest Hill, a suburb of London, England, Mr. Young came to this country in 1886, settling in Nebraska, where he operated a ranch. In 1892, he joined the Omaha Gas Company, a subsidiary of the United Gas Improvement Company, as clerk of the works. While holding that position he took the three-year educational course of the American Gas Light Association, and after spending about two years at the works, he was transferred to the newly-organized commercial department as the first salesman to be employed there. He was one of the first salesmen put in the field by the United Gas Improvement Company. In 1897, he was made agent of the South Omaha branch of the Omaha Gas Company.

Mr. Young came to New Jersey in 1899, as agent in the Passaic office of the Paterson and Passaic Gas and Electric Company. In 1902, he was made assistant secretary of that company and subsequently Passaic agent of Public Service Corporation of New Jersey, formed in 1903. In 1907, he became agent of the Essex Division of Public Service Corporation of New Jersey, gas department, with offices in Newark. When Public Service Gas Company was formed in 1909 Mr. Young was made Essex Division agent and a year later took the same position with Public Service Electric Company upon its organization. In 1913 he became new business agent, or sales manager of the two companies. On April 13, 1926 Mr. Young was elected vice-president in charge of sales, Public Service Electric and Gas Company.

Surviving Mr. Young, in addition to his wife and one daughter, are three brothers and three sisters. One brother, Percy S. Young, is vice-president in charge of finance, Public Service Corporation of New Jersey.

Mr. Young kept up a lively interest in the activities of national electric and gas organizations. He was a member of many important committees of the American Gas Association, National Electric Light Association, New Jersey Gas Association and other organizations.

To Continue Spring Conferences

Having demonstrated its success, the custom of the American Gas Association to hold an executive conference each year will be continued. This year's conference took place May 1 and 2 at Atlantic City, at which time the following resolution was adopted by the conference and approved by the Executive Board:

"Resolved, that the practice of the American Gas Association established several years ago of holding an executive conference each year has again proved itself to be most valuable to those attending, to the Association, and to the gas industry, and we strongly recommend that the practice be continued."

Industrial Gas Section

D. W. CHAPMAN, Chairman C. W. BERGHORN, Secretary A. J. PETERS, Vice-Chairman

Producer Gas Committee Meets

A SPECIAL committee of the Industrial Section to deal with the competitive aspects of producer gas met at American Gas Association Headquarters on May 4. The purpose of this meeting was to discuss individual reports on producer gas competition in order to formulate a general plan by which producer gas competition may be successfully met and overcome.

Since the experience of a small committee was naturally confined to a relatively limited number of cases, it is hoped that industrial gas men who read this notice will send in to H. A. Sutton, chairman of the Producer Gas Committee, full details on producer gas competition in their own territory, giving the relative costs of producer gas, the rate which would secure business for the gas company, and especially the successful selling arguments if producer gas was actually displaced.

Among the situations brought up at the meeting were the following:

One company sold city gas at a rate of approximately 70 cents in competition with producers for two reasons: First, the producer sales organization made extravagant claims which could not be substantiated when the figures were carefully analyzed. Doubt was raised in the customer's mind as to the truthfulness of the statements made by the producer company, and therefore preferred to deal with the gas company. Secondly, the particular territory has a policy of permitting manufacturers to combine meter readings in various plants under the same management in any one township. Therefore, the introduction of producer gas at one plant would have raised the cost of fuel in three other plants in the same area.

Another situation resulted in the sale going to the producer company, because the available rate at 71 cents was not competitive with the estimate of the producer company at 28 cents per equivalent M cu.ft. of city gas. However, after the producer was in operation for some time, a very careful test run by the utility company in cooperation with the manufacturer gave a weighted cost equivalent of 46 cents per M for the producer gas. This resulted principally from the fact that the original estimates were based on an equivalent of 3.8 cu.ft. of producer gas to 1 cu.ft. of city gas, but the data when checked was found to be as follows: The average for the plant, 5 cu.ft. of producer gas equal to 1 cu.ft. of city gas; and where severe reducing atmospheres were necessary for special operations, 6 cu.ft. of producer gas equal to 1 cu.ft. of city gas.

The following thirteen sales arguments against producer gas were read and are to be discussed further:

1. Usual producer gas installations provide for no standby equipment. From a production viewpoint, this is of vital importance, and failure to provide duplicate equipment is hazardous economically. On the other hand, duplicate equipment will mean added cost.

2. Gas making is a separate business, and to add gas-making problems to manufacturing problems already extant is not advisable.

3. Gas companies have shut-downs on their producers which are in daily operation in their own plant. A manufacturer is certain to have the same difficulty.

4. The B.t.u. value of producer gas is a variable, depending upon the B.t.u. value of the coal, depth of fuel bed and temperature of the air-steam blast.

5. The formation of clinkers is almost invariable. This requires either momentary shut-down for removal, or else hand labor to break up the clinker, adding costs which do not show on the producer balance sheet ordinarily set up.

6. It is of greatest importance to point out to the manufacturer that, regardless of claims made in writing or verbally prior to the signing of the contract, standard producer gas contracts include in the final paragraph a rescinding of all previously made promises. The wording of these should be carefully studied.

7. Although frequently compared on a B.t.u. for B.t.u. basis, the evidence at hand from many plants investigated shows that it takes about 1200 to 1400 B.t.u. in producer gas for each 1000 B.t.u. in manufactured gas.

8. Producer gas is an occasionally satisfactory fuel under constant load, but not satisfactory under variable load.

9. The gas company provides as part of its service paid for in city gas, a free periodic service on all industrial gas equipment. Its engineers assist, moreover, in the study of improvements in operation, and often aid in the designing of new equipment.

10. In case of operating trouble, prompt service can be obtained from the local utility company. There need be no delay or long shut-down.

11. The astounding savings indicated by producers are savings principally on paper. Only a small slip or operating difficulty is necessary to wipe these out.

12. The cost of producer gas is fixed, once the producer is installed, for a period of many years. Manufactured gas costs have shown a downward revision that has been very rapid in recent years.

13. The manufacture of gas is not without its physical hazards, which are undesirable for most manufacturers to assume.

Research of Jominy and Murphy

ELSEWHERE in this issue of the MONTHLY there is an interesting article by Walter E. Jominy and Donald W. Murphy on the equilibria in the iron-oxygen-hydrogen system. This work consisted principally of taking a mixture of hydrogen and water vapor and passing it over very pure iron heated to various temperatures, exposing the iron for about thirty minutes. At the end of this exposure, the iron was taken out and quenched in distilled water to stop any further action. Then, by an appropriate method it was determined whether the sample had been oxidized by the exposure to the gas mixture. As a result of a number of determinations, it was possible to fix a curve showing the relation of temperature to mixtures of hydrogen and water vapor for the equilibrium conditions. Under these, the iron would neither oxidize nor would iron oxide be reduced.

The value of these equilibria determinations is in checking the work of other scientific investigators, and also to provide an indirect approach to the problem of dissociation in flames.

Large Volume Water Heating in Restaurants

THROUGH the cooperation of The Peoples Gas Light & Coke Co. of Chicago, the Association has been able to contact Thompson's Restaurants, owners of a large chain located in thirty-nine cities throughout the country and having a total of 127 restaurants, in reference to large volume water heating with gas. The response of the officials of the company has been very favorable towards the subject, and it would probably be advisable for the representatives of the gas companies supplying Thompson's Restaurants to contact the local officials in reference to the use of gas for water heating.

John R. Thompson Co. writes: ". . . material sent will be of immense value to us, and wish to compliment the American Gas Association upon their belief that all information published regarding activities of the Association is of value to the user as well as to members of the Association."

Since those outside the industry find the A. G. A. publication *Water Heating* so valuable, it is urged that every industrial and domestic water heating salesman who has not yet done so, obtain his copy of the book. $1.50 from A. G. A. Headquarters.

Industrial Gas Ads Are Available

Gas-fired installation for metal lithographing.
GAS
FOR HEAT WHEREVER HEAT IS NEEDED
From the jeweler's tiny torch to the mighty blast furnace. The free book "Gas Heat in Industry" tells the whole story. Send for it.
AMERICAN Gas ASSOCIATION
420 Lexington Avenue, New York

One of Series of Industrial Gas Advertisements

THE Advertising Committee of the Industrial Gas Section, American Gas Association, has just issued a portfolio of advertisements, twenty-two pieces in all, which will be used in various trade journals covering the period from March, 1931, to February, 1932, inclusive.

The illustrations and copy cover gas installations in industries that are already good gas users, and where the need for gas in wholesale quantities is continually expanding.

The portfolio gives information as to when and where each advertisement will appear, thus enabling companies, who wish to do so, to use the copy in local publications, or more particularly send separate proofs of it, by mail, to their prospects or present customers.

Reprints of any or all the advertisements in any desired quantity may be had for the costs of printing, plus postage. Mats and electrotypes may also be secured at cost.

The portfolio itself is an illuminating review of the many remarkable things that gas is now doing in industry. Just a cursory glance through it is almost a liberal education on this new and rapidly developing department of the industry. Advertising experts and others who have commented on this portfolio are unanimous in the opinion that it is the best collection of industrial gas publicity that has, so far, been put together.

An example of the type of advertising is shown herewith.

U. S. Chamber to Study Effect of Taxes on Living Cost

AT the suggestion of the Executive Board of the American Gas Association, the Chamber of Commerce of the United States has agreed to undertake a study of the final effect of taxation on the cost of living. The Chamber in annual convention in Atlantic City, May 1, adopted the following resolution:

"WHEREAS, the mounting volume of Federal, State and Local taxation is rapidly becoming a serious burden to most of our major industries and falls ultimately upon the average voter, finding reflection in the cost of practically all of the necessities of life, and

"WHEREAS, the major portion of such increased taxation results from the extension of various Federal, State and other governmental projects most of which are, directly or indirectly, subject to popular vote, and

"WHEREAS, a study of the final impact of taxation on the cost of living, indicating what proportion taxes represent of the amounts spent by the average voter for food, clothing, shelter, etc., would appear to be the most effective means of emphasizing to the voters the results of increasing governmental expenditures of all sorts.

"BE IT RESOLVED, that the Chamber of Commerce of the United States undertake a study of the final effect of taxation on the cost of living, if advisable with the cooperation of such agencies as the National Industrial Conference Board or similar bodies which have already conducted studies and investigations of taxation and the cost of living."

Supplementary Industrial Bibliography

GENERAL—A

Furnace Design—A-V

Steel ..... Furnace design incorporates many new developments. . Apr. 2, 1931, p. 44

HEAT TREATMENT OF FERROUS METALS—B

Miscellaneous—B-XI

Blast Furnace & Steel Plant ..... The influence of atmosphere on the scaling of mild steel ..... Feb. 1931, p. 273
(Composition of non-scaling atmospheres 1000° C. mild steel 0.07% C.)

METAL MELTING—D

Stereotype, Linotype and Monotype—D-II

Industrial Gas. . A recent stereotype pot installation ..... Apr. 1931, p. 15
(Operating temperatures and gas consumption. Mfd. gas.)

INDUSTRIAL STEAM APPLICATIONS—E

Industrial Gas. . Steam boiler performance in corrugator operation..... Jan. 1931, p. 19
(Operating and fixed charges—typical industrial steam installation.)

Western Gas. . . Comparison of natural gas and coal combustion..... Mar. 1931, p. 32
(Analysis—stack losses, comparative efficiencies, costs.)

WHOLESALE BAKING—F

Bread—F-I

Industrial Gas. . Modernizing the bakery..... Apr. 1931, p. 11
(Natural gas versus oil in Dutch ovens.)

FOOD PRODUCTS—G

Potato Chips—G-II

Industrial Gas. . How a national delicacy is made ..... Apr. 1931, p. 27
(Frying potato chips. Mfd. gas.)

CERAMICS—J

Frit Smelting—J-IV

Heat Treating & Forging... Gas cuts cost of fusing enamel to metal..... Mar. 1931, p. 289
(Cost of operation—4 x 10 furnace.)

Miscellaneous—J-VII

Gas Age-Record ..... Natural gas as a fuel in the ceramic industry..... Mar. 7, 1931, p. 335
(Advantages of gas over other fuels in specific applications.)

Journal American Ceramic Soc. ..... The heat balances of some ceramic kilns..... Feb. 1931, p. 89
(Efficiency of coal-fired kilns.)

Range Division Organizes; Adopts Program

MANUFACTURERS of gas ranges, who met at the White Sulphur Springs, W. Va., last month and organized themselves into the Range Division, Manufacturers Section, American Gas Association, voiced the opinion that the time is ripe to set up standards of practice for that branch of the industry.

Under a program, which was approved, it will be the aim of the range manufacturers to eliminate and avoid what were characterized as "wasteful procedure and obsolete policies." This decision was reached as a result of a disinterested analysis of the production and sale of gas ranges, and the program outlined for the Range Division, embraces the following major activities:

Cross-licensing of patents, standards of practice, development of accurate statistical data, establishment of a closer cooperative effort with the A. G. A. Testing Laboratory, cooperation in the enactment of safety ordinances for the protection of life and property, and development of a closer cooperative spirit among range manufacturers generally.

Paul Tappan, president of the Tappan Stove Company, Mansfield, Ohio, was elected chairman of the Cross Licensing of Patents Committee. He will be assisted by ten members.

Stanley Grady, secretary of the Roberts & Mander Stove Co., Philadelphia, Pa., was elected chairman of the Standards of Practice Committee. He will be assisted by eight members.

Carl F. Hoffstetter, president of the Odin Stove Co., Erie, Pa., was elected chairman of the Safety Ordinance Committee. Mr. Hoffstetter will be assisted by six members.

A meeting of the Range Division, Hot Water Heater Division, Space Heater Division and Miscellaneous Division has been called for September 17 and 18, at Detroit, Michigan. The Book-Cadillac Hotel has been designated as headquarters.

Prior to the September meeting, preliminary organization of the Hot Water Heater and Space Heater Divisions is expected to be completed. This will give the Manufacturers' Section three complete divisions.

Banana Ripening

CORDIAL relations between A. G. A. Headquarters and several large shippers of bananas has led to an increased interest in the application of gas for banana ripening. It is hoped to devise a small, low priced warm-air furnace which will specially meet the needs of banana rooms. All told, there are about 8,000 of these in various parts of the country, and many are already on gas but are using very cheap, homemade equipment without controls. A movement is under way to improve the construction of these banana rooms, equip them with fans, insulate them, and, therefore, there is an excellent opportunity to sell an improved type of gas heater and humidifier to use with them. Banana ripening is a rather critical operation, because it is easy to spoil the fruit by heating it improperly.

A banana room on the average takes a carload of fruit, 21,000 pounds, specific heat 0.9, and this must be heated from a temperature of 52°-55° up to about 70° at a rate of three degrees per hour. It is also desirable to maintain the humidity above 85 per cent in order to speed up ripening. It is estimated that a gas unit having an input of 100,000 B.t.u. per hour will be approximately the right size for one of these banana rooms.

Technical Section

R. G. GRISWOLD, Chairman H. W. HARTMAN, Secretary K. H. CREE, Asst. Secretary I. K. PECK, Vice-Chairman

Equilibrium in the Iron-Oxygen-Hydrogen System at Temperatures above 1000° C.*

By WALTER E. JOMINY and DONALD W. MURPHY

Department of Engineering Research, University of Michigan, Ann Arbor, Mich.

THE results presented in this paper were obtained as part of an investigation of the scaling of steel at forging temperatures. This study of the scaling of steel in turn was one of a series of investigations concerned with the application of heat to forging conducted during the past four years at the Engineering Research Laboratories of the University of Michigan for the committee on Industrial Gas Research of the American Gas Association. A method of test and equipment were developed which made possible the determination of the rate of scaling of steel at temperatures up to 1427° C. It was suggested that this equipment and method of test might be used to determine the equilibria for the system iron-iron oxide-hydrogen-water vapor, and that in this manner an independent check might be obtained of the position of the iron-iron oxide line. Further, since by this method tests could be made up to 1427° C., it would be possible to check the melting point of ferrous oxide and to calculate its heat of fusion.

Inasmuch as this information was desired in the study of scaling, it was decided to make such an investigation. The method of test consisted in passing mixtures of hydrogen and water vapor over a sample of electrolytic iron at a given temperature and then determining whether the iron was oxidized in the particular mixture of gases. This method or test and the equipment used have already been described by the authors. While the tests with the hydrogen-water vapor mixtures were in progress, a paper on the same subject using a similar method was published by Emmett and Schultz. This excellent paper showed the position of the iron-iron oxide line at 1000° C. and temperatures below. Since the work of the present writers was all conducted at temperatures above 1097° C. and especially since at 1371° and 1427° C. the ferrous oxide is liquid, it was believed worthwhile to finish the work.

Eastman, in 1922, very ably reviewed the available literature on this system. He noted that in general the results of preceding investigations fell into two groups differing by about 50 per cent, and there seemed to be no reason for choosing one set in preference to the other on the basis of experimental procedure.

In none of this previous work, however, is there any reliable information concerning the reaction above 1000° C. which leaves unknown the equilibria above the melting point of the oxide. Such information is particularly needed in the application of physical chemistry to steel making.

EDITOR'S NOTE: This work of Jominy and Murphy, resulting as a by-product of the American Gas Association investigation on the scaling of steel at forging temperatures, is of considerable interest beyond the fact that it presents data confirming the work of experimenters who were especially studying the percentages of hydrogen, oxygen and water vapor which can exist together in the presence of the lower oxide of iron. Since the method used by Jominy and Murphy was dependent on observations on the iron, and since at each temperature determinations were made both above and below the equilibrium conditions, it is probable that this work is free from the criticism raised by Eastman that the flow method is not satisfactory for the determination of these equilibria. In view of the fact that the Jominy and Murphy data fell in line with the Emmett and Shultz investigations, and for other technical reasons, it has been decided to utilize this data in the forthcoming edition of the A. G. A. book "Combustion" as one of the approaches to the important problem of dissociation of CO_2 and H_2O in flames. The particular equilibria determined by Jominy and Murphy have not much direct application in the gas industry, but serve as an indirect determination which, averaged with other direct determinations, permits an accurate evaluation of the water gas equilibrium constant.—C. G. S.

Experimental Method

The method of test was similar to that used by the authors in the investigation of scaling. The gas mixture of hydrogen and water vapor was passed over electrolytic iron for about 30 minutes, at the end of which exposure the iron was quenched into distilled water to stop the reaction. By means of the analytical method employed in the previous work on scaling it was possible to determine whether the sample had been oxidized by the exposure to the gas mixture.

The electrolytic iron used was obtained in sheets about 0.8 mm. ($^1/_{32}$ inch) thick and was annealed for 3 hours at 1000° C. in moist hydrogen to decrease the carbon content. After annealing, the analysis of the iron was found to be:

	%
Carbon	0.012
Manganese	0.008
Sulphur	0.007
Phosphorus	0.002
Silicon	0.001

To make the test sample the iron was polished bright and then bent into the shape of a tube 20.6 mm. ($^{13}/_{16}$ inch) outside diameter and 25.4 mm. (1 inch) long. Each sample was then numbered, washed in ether, weighed, and kept in a desiccator until placed in the furnace, care being taken not to touch it with bare hands after the polishing operation.

The desired ratio of hydrogen to water vapor was maintained by passing the hydrogen through water held at a predetermined temperature. To do this a large glass container was filled with water which could be maintained at any desired temperature by means of an electric heater and pump. In this water bath were placed five glass bottles connected by glass tubes. Four of the bottles were filled with distilled water. The bottles and connecting tubes were sealed and entirely immersed in the water of the container. The hydrogen to be saturated was then passed through the four bottles of distilled water and finally through the empty bottle to remove entrained water. The equipment was then calibrated to determine the percentage of water in the hydrogen at temperatures from 70° to 80° C. The values thus found correspond to the percentage of water required for saturation at the particular temperature.

The glass tubing which conducted the water-hydrogen mixture to the furnace was heated by means of an electric coil

* Digest of reprint from Vol. 23, Page 384, Industrial and Engineering Chemistry, April, 1931.

in order to avoid any precipitation of moisture from the hydrogen. The furnace tube consisted of a porcelain tube glazed on the outside and mounted inside of a Carborundum muffle. The porcelain tube extended out 12 inches (30 cm.) beyond the furnace at one end so that it could be closed with a rubber stopper. The furnace was heated with gas. The thermocouple, which was platinum, platinum-rhodium, was so mounted that the bead of the thermocouple was about ¼ inch (6 mm.) away from the center of the test sample. Readings were taken each minute that the sample was in the furnace and the temperature was maintained within ±3° C. It is, of course, appreciated that at the higher ranges the accuracy of the thermocouple is only ±5° C.

To make a test, the gas mixture was passed through the tube for about 20 minutes at a velocity of about 9.2 meters (30 feet) per minute to purge the tube, and at the same time the temperature was adjusted. A small positive pressure was maintained in the tube at all times by keeping the specified rate of flow. The rubber stopper was then removed from the cold end of the tube and the sample, previously mounted on a wire boat so that it could not touch the refractory tube, was placed in the tube and pushed into the hot zone directly under the bead of the thermocouple. After remaining in the furnace for 30 minutes, the sample was pulled out of the tube and allowed to fall from the edge of the tube into cold distilled water. The sample was weighed before and after exposure. A loss in weight indicated that scale was split off by the sudden cooling in the distilled water. The scale that still remained on the piece was removed by the electrolytic pickling method used by the authors in their previous investigation.

The experimental procedure permitted the immediate stopping of the reaction, but caused a small amount of scale to form on the iron both from contact with the air for about a second and from reaction with the cooling water. The loss in weight produced by this reaction of unoxidized iron with water and air was approximately constant for any given initial temperature of the iron and was in all cases much smaller in amount than that formed during heating in oxidizing atmospheres. It was found that the method made it possible to observe the effect of a change of 0.5 per cent of water vapor in the gas mixture at the point of change from non-scaling to scaling, since at the temperatures used in this investigation there was a decidedly sharp increase in the scaling when the water vapor was increased slightly above the equilibrium percentage. For instance, at 1260° C., using a mixture of hydrogen and water vapor containing 44.2 per cent of the latter, there was a loss in weight of 0.127 gram per 100 sq.cm. of surface, whereas with 44.6 per cent water vapor there was a loss of 0.96 gram per 100 sq.cm. With atmospheres containing less than 44.2 per cent moisture, the loss was approximately the same as at 44.2, while atmospheres containing more than 44.6 per cent moisture caused consistent increases in loss in weight. The true equilibrium composition was thus fixed at 1260° C. between 44.2 and 44.6 per cent moisture.

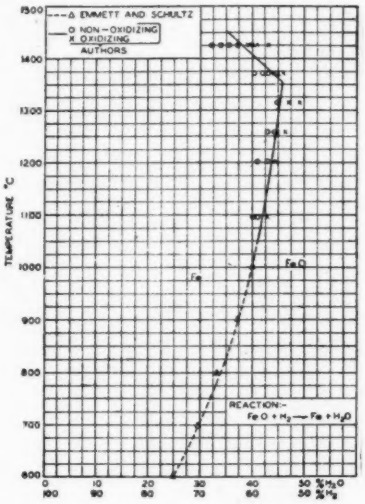


Fig. 1. Equilibrium of Iron-Oxygen-Hydrogen System at Temperatures up to 1427° C. Plotted Against Gas Composition

At the temperatures at which the scale was liquid—that is, at 1371° and 1427° C. —it was not possible to use a wire boat to mount the sample. Accordingly, a boat was made from Chrom-patch cement in the shape of a segment of a cylinder about 25 mm. (1 inch) longer than the iron sample and 38 mm. (1.5 inches) wide. Small sillimanite cross bars were cemented onto the boat and the iron samples were placed across these bars so that they touched at only two points. At these higher temperatures the point where scaling just commences is easily found, since with an increase of only 0.5 per cent in water-vapor content above this point blisters are formed on the steel as a result of the coagulation of liquid iron oxide.

Results

Tests were made at 1097°, 1204°, 1260°, 1316°, 1372°, and 1427° C. The results are given in Table I and Figure 1. The curve in this figure was drawn so that at all temperatures it was between the lowest point at which scaling occurred and the highest point at which scaling did not occur. The lower part of the curve is drawn from data taken from the work of Emmett and Schultz, whose values are in line with those obtained by the authors.

In attempting to find the approximate location of the equilibrium at 1260° C., an extrapolation of the curve of Eastman and Evans was used. It was found that the water-hydrogen ratio indicated by this extrapolation produced decided oxidation at this temperature and that the point at which oxidation was just eliminated corresponded to a water-hydrogen ratio of 0.792. From this it appeared that the extrapolation of the curve of Eastman and Evans could not be used in obtaining the approximate location of the equilibrium to be used as a guide in the preliminary tests. The curve shows that less hydrogen is required to stop scaling at 1316° C. than at 1097° C. This, of course, might have been expected from the results of previous investigations. The change in

Table I—Experimental Data from Scaling Tests

Run	Temp. ° C.	H_2O %	Scaling	Temp. ° K.	$\frac{1000}{\text{Temp. (° K.)}}$	K	—Log K
12	1088	42.9	Yes	1360	0.735	0.7500	0.12494
13	1091	41.1	Yes	1363	0.733	0.6983	0.15595
14	1091	41.0	No	1363	0.733	0.6962	0.15730
15	1094	40.0	No	1366	0.732	0.6654	0.17692
5	1205	44.3	Slightly	1480	0.675	0.7964	0.09887
9	1204	42.9	No	1480	0.675	0.7493	0.12535
6	1204	40.8	No	1480	0.675	0.6887	0.16195
2	1259	46.1	Yes	1533	0.652	0.8566	0.06720
16	1262	44.7	Yes	1533	0.652	0.8078	0.09269
18	1259	44.6	Yes	1533	0.652	0.8052	0.09410
3	1260	44.2	No	1533	0.652	0.7921	0.10123
4	1260	42.9	No	1533	0.652	0.7505	0.12464
19	1256	42.9	No	1539	0.654	0.7500	0.12497
7	1316	49.0	Yes	1590	0.630	0.9617	0.01697
8	1316	46.7	Yes	1590	0.630	0.8765	0.05725
11	1315	44.7	No	1590	0.630	0.8067	0.09330
20	1371	46.4	Yes	1645	0.609	0.8670	0.06196
21	1372	44.6	Yes	1645	0.609	0.8047	0.09437
1R	1371	43.9	Yes	1645	0.609	0.7836	0.10590
22	1372	42.9	No	1646	0.609	0.7505	0.12467
8R	1371	42.8	No	1645	0.609	0.7498	0.12505
27	1371	41.8	No	1645	0.609	0.7196	0.14293
26	1371	40.1	No	1645	0.609	0.6684	0.17497
23	1427	43.0	Yes	1700	0.589	0.7533	0.12301
24	1427	40.7	Yes	1700	0.589	0.6852	0.16418
7R	1427	39.9	Yes	1700	0.589	0.6646	0.17742
25	1427	39.2	Yes	1700	0.589	0.6443	0.19090
12R	1427	39.0	Yes	1700	0.589	0.6399	0.19391
31	1426	36.9	No	1699	0.589	0.5849	0.23292
28	1427	35.3	No	1700	0.589	0.5449	0.26368
29	1425	33.6	No	1698	0.589	0.5060	0.29589
30	1424	32.0	No	1698	0.589	0.4713	0.32674

direction of the curve above 1357° C., however, could not have been predicted. It is due to the fact that ferrous oxide is molten above this temperature.

Figure 2 was plotted from data also presented in Table I and data given by Emmett and Schultz. The points at 1000° C. and below are those of Emmett and Schultz. This curve was drawn by plotting log K as ordinates and $1000/T$ as abscissas where K is the ratio P_{H_2O}/P_{H_2} and T is degree absolute. At all temperatures the curve lies between the closest scaling and non-scaling points. It will be noted that there is a sharp change in direction of slope where $1000/T$ has a value of 0.613, corresponding to a temperature of 1357° C. The change in slope is due to the melting of ferrous oxide, and the point at which the break occurs agrees quite well with Herty's range of 1355-1377° C. for the melting point of ferrous oxide. From the slope of the two branches of this curve the heat of fusion of FeO was calculated from the equation

$$\frac{\triangle H}{RT^2} = \frac{d \ln K}{dT}$$

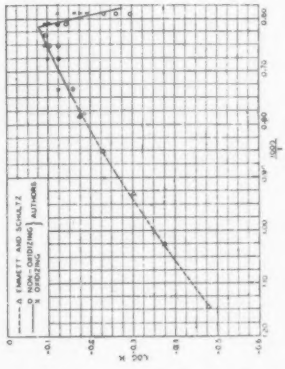


Fig. 2. Equilibrium Constants of Iron-Oxygen-Hydrogen System at Temperatures up to 1427° C.

in which $\triangle H$ is the heat of reaction, R is the gas constant (1.998), T is absolute temperature, and K is the ratio P_{H_2O}/P_{H_2}. This calculation shows the heat of fusion to be +29,000 calories per gram-mol. Since the heat of fusion depends so greatly on the slopes of the two branches of the curve, and since even the melting point of ferrous oxide is not accurately known, the authors believe that the value of +29,000 is only approximately correct. The probable error in the curve below the melting point is estimated at 1.0 per cent, but above the melting point, because of the few temperatures used and experimental limitations, the error may be 2 or 3 per cent. In view of these errors and the possibility of drawing several curves through the points above the melting point of the oxide, it is found that there is a possible variation of ±5000 calories.

A. G. A. Course in Domestic Gas Appliances Begins June 15

A COURSE in Domestic Gas Appliances will be given at the American Gas Association Testing Laboratory, Cleveland, O., the week of June 15-20. While this course is sponsored by the Home Service Committee of the A. G. A., its membership is not limited to Home Service Directors. Service men and others interested are invited to attend this course.

This will be the third year the course has been given and it is an intensive week of lectures and laboratory work on all domestic gas appliances, the instruction being given by laboratory engineers, and others in the industry who are specialists in certain relative subjects. An outline of the program follows:

MONDAY, JUNE 15

9:00- 9:30 Registration.
9:30-10:00 Opening remarks by R. W. Gallagher, president, East Ohio Gas Co.
10:00-10:30 Outline of Course.
10:30-12:00 "What Service Workers and Home Economics Teachers need to know about Gas"—N. J. Reiff, Testing Engineer in Charge of Course.
2:00- 3:00 "Application of Heat to Various Foods in Baking"—Miss Dorothy Shank, Director, Research Kitchen, American Stove Co.
3:00- 4:30 "Gas Ranges, Their Design and Operation"—C. S. Stuckenholt, Laboratory Foreman.

TUESDAY, JUNE 16

9:00- 9:30 "The Home Service Workers Place in the Industry"—R. M. Conner, Director, A. G. A. Laboratory.
9:30-11:00 "Gas Range Thermostats"—W. R. Teller, Testing Engineer.
11:00-12:00 "Gas Refrigeration"—N. T. Sellman, Ass't to the Vice-Pres. Director of Sales and Utilization, Consolidated Gas Company of New York.
2:00- 3:30 "Water Heaters, Types and Design"—F. Rutherford, Testing Engineer.
3:30- 4:30 "Water Heaters, Service Conditions"—E. J. Horton, Mechanical Engineer, Ruud Water Heater Company.

WEDNESDAY, JUNE 17

9:00-10:30 "What the Bakeries are doing to Increase their Business in Bread and Fancy Goods"—E. D. Milener, Industrial Research Representative, American Gas Association.
10:30-11:00 "Home Service as a Sales Activity"—B. H. Gardner, Director of Sales, Columbia Engineering & Management Corp.
11:00-11:30 "Design and Performance of Gas Fired Incinerators"—W. Smith, Testing Engineer.
11:30-12:00 "Merchandising Incinerators"—W. R. Lacey, president, Kernit Incinerator Co.
2:00- 3:30 "Space Heaters, Various Types and their Comparative Advantages"—K. H. Flint, Chief Inspector, A. G. A. Laboratory.
3:30- 4:30 "Effect of Change-over from Manufactured to Natural Gas"—F. E. Vandaveer, Supervisor, A. G. A. Laboratory.

THURSDAY, JUNE 18

9:00-10:30 "Central Heating and Cooling for the Home"—W. E. Stark, Research Engineer, Bryant Heater & Manufacturing Co.
10:30-11:30 "The Business of Home Service"—Miss Jessie McQueen, Home Service Counsellor, American Gas Association.
1:30- 4:30 Practical Work in the Adjustment and Use of Gas Appliances.

FRIDAY, JUNE 19

9:00-10:00 "The Use of Portable Gas and Butane Air"—W. P. Cook, Testing Engineer.
10:00-11:00 "A Comparison of the Relative Costs of Gas and Electricity"—K. R. Knapp, Chief Research Engineer, A. G. A. Laboratory.
11:00-12:00 "Home Service and the Homemaker"—Miss Karen Fladoes, chairman of Home Service Committee, A. G. A., Equitable Gas Co., Pittsburgh, Pa.
2:00- 3:00 "Testing and Inspection Procedure of the A. G. A. Testing Laboratory"—F. R. Wright, Publication Editor, A. G. A. Laboratory.
3:00- 4:30 A trip through the Laboratory.

SATURDAY, JUNE 20

9:00- 9:30 "Clothes Dryers"—W. Smith, Testing Engineer.
9:30-10:00 "Clothes Dryers"—W. P. McCoy, General Sales Manager, Judelson Dryer Corp.
10:00-11:00 "Chimney Conditions"—J. Corsiglia, Ass't Chief Engineer, A. G. A. Laboratory.

Home Service Activities

What Home Service Workers Should Know About Hot Water Service*

By J. G. AMES

Western United Gas & Electric Co., Aurora, Illinois

J. G. Ames

ASSUMING that the purpose of the Home Service Worker is to train customers in the complete use of appliances, it seems that her work in connection with hot water service is important and should fall under three general classes:

(1) Instructing customers in the proper and complete use of hot water service following the installation of a new automatic water heater in order that they can obtain the greatest benefit from it and acquire a proper appreciation of the advantages of running hot water.

(2) Settlement of gas bill complaints where the increased consumption is found to have been caused by the addition of an automatic water heater.

(3) By various services to be rendered in connection with promotional and educational work such as conducting group demonstrations, educational advertising, etc., especially in connection with the Sales Department.

In connection with hot water it is the job of the Home Service Worker to acquaint the homemaker with the various conveniences and uses that can be made of running hot water in order that the customer can realize the most from this service. It seems that the proper time to do this work would be at the time when the heater is first installed. This would insure that the customer would acquire this valuable information at the start. It might be the means of preventing many of the high bill complaints which come in shortly after a heater is installed.

Hot water is now used in the home principally for kitchen use (including cleaning), for laundry and bathroom use. While there are no figures, of course, available, it is probable that about one-half of the total hot water is used in the kitchen where dish washing, scrubbing, cleaning, etc., are done. Approximately one-half of the balance is used in the bathroom and the remainder in the laundry. These figures are merely an opinion and are cited only to give an approximate idea of the uses of hot water service in the home.

Perhaps the best procedure would be to take up with the customer the uses of hot water in the kitchen, bathroom and laundry in their respective order. In the kitchen, for example, hot water is used for general cleaning, washing dishes, etc. Perhaps the Home Service Worker may know how the freer use of hot water will greatly reduce drudgery in the kitchen without materially affecting the cost. Furthermore who knows how much sickness is unknowingly caused by poor cleaning and sterilizing and what its cost is to our customers? Here is where the Home Service Worker by acquiring specialized knowledge may be able to show the homemaker by actual bacteriological tests that dishes, for example, cannot be washed clean and sterilized unless the water is hot enough and a sufficient quantity is used. In selling such uses to the homemaker it would seem that the relatively small cost of these operations will do much to convince the customer that the service is really inexpensive.

In connection with the bathroom there is considerable information that should be of great interest to the customer and which will give him an increased appreciation of this convenience. Real Estate men tell us that the bathroom and kitchen sell the modern home. The bathroom in a well appointed home is by far the most expensive room in the house when its size is considered. Yet how inconsistent to have a lavishly equipped bathroom without the very agent for which the bathroom was created—running hot water! The exquisitely finished bathtub, set in tile, is but an expensive ornament, rarely made use of, when connected with a tank heater. With an automatic heater connected to the bathroom these fixtures, in addition to their ornamental value, become the most useful services in the house.

One of the most interesting uses of hot water in the bathroom besides cleanliness is in connection with health. Everyone is familiar with the powerful appeal to the public of anything that pertains to health, particularly the common cold. It is a matter of general knowledge that a warm bath is one of the most useful agents in connection with curing a cold. Furthermore, effective cures for other ailments have recently been announced by medical science, the agent being nothing but a hot bath over a given period of time with the temperature carefully regulated.

Concerning the three general uses of hot water in the home, the opportunity for the Home Service Worker seems to be more concerned with laundry appliances than with either of the other two. The questions asked by the customer concerning hot water usually concern some laundry appliance. There is an additional reason and a very important one why the Home Service Worker should become a specialist on laundry equipment. Reference is made to the present tendency of our domestic customers to send their washings to the commercial laundry where they are usually done in a plant using coal for fuel, instead of doing them in the home, making use of gas and electricity. We must recognize the growing signs of this competition and realize that it is far easier to prevent losing this business than it is to regain it after it has been lost. It is obvious that any work that the Home Service Worker can accomplish in the line of persuading our present laundry customers to continue to do their laundry work at home will certainly be beneficial to the residential gas revenue.

The principal laundry appliances for the home are the washer, ironer and clothes dryer. It is, of course, recommended that they be used in connection with the automatic water heater. A washer tub requires about 10 gallons of water at a temperature of 140° F. to 180° F. The washing process requires not over 20 minutes per tub in the ordinary machine, the process varying according to the machine. The Home Service Worker should be thoroughly familiar with the procedure of the particular machine or machines in her territory in order that she can give expert advice concerning the washing process to the customer.

By the use of an automatic water heater, a washing in the ordinary home is done with very little drudgery. It has in its favor practically every advantage. It is most economical, the cost being only a fraction of that required by the commercial laundry. In addition it has in

* Digest of paper presented before Home Service Conference, Chicago, Ill., Mar. 26, 1931.

its favor cleanliness because the family clothes are washed by themselves instead of being placed in a large washer with many others. A further well-known advantage is that clothes washed at home are washed much cleaner and with much more gentleness, with the consequent effect that they look better and last much longer.

The washer is extremely valuable from the standpoint of the hot water load it builds. Although its sale is usually promoted as an electric appliance, the gas load it creates is of several times the value of its electric load.

Considering the subject of high bills, investigation discloses that many complaints are the result of increases in gas consumption after an automatic water heater has been added. Considering the problem of gas companies in attaching hot water customers and the selling costs entailed, this work is of special importance. We know there is a large amount of educational work required to sell hot water service and that an automatic heater is not necessarily sold when the sales contract is signed and the appliance installed. The customer must be convinced of the advantages of the service and its consequent value to him so that he will feel that he can afford to use it freely.

A limited survey conducted a few years ago convinced the writer that gas companies would generally be surprised if they could know the proportion of those customers who buy automatic water heaters and later turn out the pilot, changing them to manual operation because they feel the gas bills are too high, thus defeating the entire purpose of the sale.

Ordinarily such high bill cases are given to the Service Department which first establishes that the increase is caused by the heater and then check the water temperature, the operation of the appliance and any other conditions, correcting whatever may be found out of adjustment. Assume, however, as is usually the case, that everything is found to be operating satisfactorily. The problem then becomes one of making a systematic analysis of the various purposes for which hot water is required in the particular home in order to sell automatic hot water service to the customer. This work would have to be done either by a service man, a salesman or by the Home Service Worker. The service man is not qualified to settle the case with the customer. The salesman is already done with the transaction after the appliance has been installed and placed in operation.

Consequently it would seem that, especially in those cases where we are in danger of losing automatic hot water customers, that the Home Service Worker is the logical one to finally approach the customer and convince him that this service is such a useful, economical and necessary convenience in his home that he cannot afford to turn out the pilot. The writer realizes that the work of the home service department does not extend to the settlement of such bill complaints and is aware that this is a large undertaking. Nevertheless, whenever the Home Service Worker is finally able to satisfy such a customer and keep an automatic heater in operation, she is accomplishing one of the most valuable services that can be rendered in this field.

Assume the case where adding an automatic water heater causes a high bill complaint from the customer and the matter is handed to a Home Service Worker after the service department has completed its investigation. It is suggested that the case first be checked over with the service man in order to make certain that no re-circulating system was found and that the appliance was in proper adjustment and found to be operating satisfactorily.

Arriving at the customer's home the first operation would be to check the temperature of the water at the tap. This is important because many high bill complaints on automatic water heaters are caused by settings of 180° F. instead of 140° F. Finding this temperature correct, however, the Home Service Worker should discuss in detail with the customer the practices followed in using hot water. Here she will find it necessary to use all the knowledge at her command to good advantage in order to learn how the gas bill was accumulated so that either the customer can be convinced that the bill is a reasonable one or that he can be shown how to change his practices in using hot water in order to reduce the bill sufficiently to be within his budget requirements.

Perhaps it will be possible to point out a number of wasteful practices which can be eliminated by the customer with consequent reduction in gas consumption. In extreme cases where there is good possibility of losing the customer to automatic service it might be advisable to recommend setting the temperature of the thermostat relatively low—say 120°—and having him turn it up on wash days, bath days, etc. The saving thus effected might be sufficient to satisfy him. In all cases success can be considered as obtained if the Home Service Worker is finally able to convince the customer to keep the heater operating automatically.

The cost of standby loss is probably the part of the customer's gas bill that he is apt to feel is too high. It may seem to him like a wasteful practice to be burning gas where no water is being used. However, hot water is of little use unless available when needed. With an automatic heater, it is not necessary to anticipate a bath about an hour in advance and neither is it necessary to make several trips to the basement to turn the burner on and off, check to see if there is a sufficient amount of hot water in the tank, etc. When some of these factors are considered, the cost of standby requirements certainly cannot seem exessive.

Considerable benefit may accrue if the customer can be shown that to realize fully the benefits of hot water service and at the greatest economy, it should be used freely. This is evident by referring to the preceding paragraphs concerning the costs of operation. It was shown here that about 3300 cu.ft. of gas per month is necessary where 1,000 gallons of hot water are used per month, or 3.3 cu.ft. of gas per gallon. If this customer's requirements increased to 2,000 gallons per month, the standby loss would, of course, still remain the same and the total gas required will be 4,100 or 2.05 ft. per gallon. Therefore, when the water consumption is doubled, the total cost of gas per gallon is reduced nearly 40%.

The inexpensiveness of heating water can be illustrated no better than by considering the cost of some of the operations in the home. For example, 10 gallons of hot water are required to fill the ordinary washer tub to the water line and 10 gallons will answer the requirements of even the largest bath. At the rate of 2.05 cu.ft. of gas per gallon of hot water, it would require not over 20 cu.ft. of gas for either. At $1.00 per M cu.ft., therefore, the cost is only two cents or at $1.50 per M cu.ft. less than three cents.

When figures like the foregoing are presented to our customer, they are apt to have the effect of changing his mind about the cost, because he appreciates the convenience and necessity of these utilities and figures presented to him this way are apt to mean more to him.

It is obvious that most of the hot water in the home is used in small quantities, a gallon or less at a time, drawn at various times during the day and night. It is also obvious that when a new use for hot water is created, the additional revenue for the one customer will not be substantial. However, if this use of such nature that it can be extended to a large proportion of our domestic customers, the gas company would notice a pronounced increase in revenue. To illustrate—if a customer could be induced to use an additional washer tub of hot water at each washing, this would amount to say three cents per week or 12 cents per month. However, if 10,000 of our present customers who have washers could be persuaded to adopt this practice, the increase in revenue would amount to $1,200 per month or nearly $15,000.00 per year. This is, of course, typical of the way the residential gas bill is built up—by the combination of a great many small uses rather than by a few large ones.

In connection with the building up of the domestic gas load, as more and more automatic heaters are installed in the homes of our customers, our increases in revenue will be dependent more on developing new uses for hot water in the home than on selling new heaters. The situation will then be similar to the present status of the gas range load and much

more work will probably be carried out by advertising, demonstration and so forth to promote new uses of hot water in the home as indicated above. Promotional and educational activities of this nature would have to be guided by an intimate knowledge of how hot water is used in the home such as is possessed only by the Home Service Worker.

It would seem, therefore, that the part played by the Home Service Worker in connection with the development of hot water service is destined to broaden materially in the future. Home service activities, whether in this or any other field, reflect in increased sales when properly conducted. Most of the aggressive utilities, recognizing this fact, have done considerable work in developing the Home Service Department. This department in turn should realize that it has been entrusted with a large, very important, and very definite job. It must not only be done effectively but likewise economically. In carrying out this work, two eminently outstanding facts should never be lost sight of—first, that the automatic water heater has more in store for our domestic business than any other appliance, excluding only house heating, and second, that the home service department by means of its most valuable contacts with our customers can do more than any other department in our business to popularize this service.

Gasettes

Miss Jessie Read, home service director, Consumers Gas Company, Toronto, Canada, reports an interesting feature in her radio work. Helen Kane and Leatrice Joy, motion picture actresses, conducted the Home Service Radio Cooking School during their visits to Toronto theatres.

Miss Bessie Harris, home service director, Connecticut Light & Power Company, Bristol, Conn., reports that her homemakers' class has been featuring "better homes programs." The local merchants and contractors have addressed the women at their meetings and have allowed the use of store space to hold public meetings.

Mrs. Ruth Wakefield, home service director, Brockton Gas Light Company, Brockton, Mass., has resigned her position to give full time to her tea room in Whitman, Mass.

How one gas company has solved the problem of limited space for maintaining permanent home service facilities is told by the success of the plan recently placed in operation by the Commercial Department of the Seattle Gas Co., Seattle, Wash. Adequate quarters were leased by the company in a new public market where thousands of housewives daily purchase their food supplies. "Miss Gasco," in the person of Miss Alice Gibbs, company home service director, with her assistant, is in charge to demonstrate modern gas appliances, give advice on menus, help in planning parties and dinners and to conduct the cooking schools. *Western Gas,* in the April issue, has an account of this activity.

The Providence Gas Company, under the direction of Kathleen Atkinson of the home service department, has for some time been holding a cooking school every week, at which 120 women have met in groups of twenty to make, under supervision, new and attractive recipes, and to learn about the insulated gas range and the gas refrigerator.

Four lectures on subjects of interest to women were given by Miss Ruth Soule, director of the home service division, The Brooklyn Union Gas Co., Brooklyn, N. Y., during the week ended May 2. She spoke on "Equipment for the Home" before fifty-five members of the Council of Federated Clubs at Hornell, N. Y.; on "Feeding the Pre-School Child" before fifty mothers at the Baby Health Station, on Bedford Avenue; before 200 home economics teachers attending the New Jersey Home Economics convention in New Brunswick, and before 600 persons at a rally of the Bay Ridge Community Club where she presented diplomas to twenty graduates of a cooking course given for Norwegian domestics.

"The Story of the Uses of Gas in the Home" or the "Romance of Gas" has been included in the lecture demonstration work of the classes of the Home Service Departments of the Public Service Co. of New Jersey.

The home service department of the Consumers Gas Co., Toronto, Canada, cooperated with the American Honey Institute, the Ontario Beekeepers Association, the Honey Producers Cooperative at their large convention in Toronto recently. The department gave lectures on honey, having as guest lecturers Miss Malitta Fischer, of the American Honey Institute, and Miss Mary Barber of the Kellogg Co. This gave the department much publicity since it was included on the programs of the conference activites, as well as in newspaper notices and advertising.

During this year the home service division of the Consolidated Gas Company of New York has been cooperating with the "Prudence Penny Department" of *The New York American.* One day each week Prudence Penny has the privilege of using the main auditorium in the Consolidated Building to entertain her group. This group consists of housewives in the metropolitan area, who read *The American* and are interested in seeing food prepared, using products that are advertised in the paper. The courtesy of the Consolidated Gas Company has been reciprocated by having one of the home service assistants give a twenty-minute food demonstration and a talk on gas appliances at each of the weekly meetings. Every month a party is held at Carnegie Hall by the *New York American* organization for a group numbering about 4,000. A twenty-five minute food demonstration is given by a home service assistant, which is preceded with an introductory speech by the director of the department.

Improving Distribution System in Jersey

TO provide improved gas distribution and storage facilities in Hudson and Bergen counties, Public Service Electric and Gas Company is erecting a compressor house at its West End Gas Works in Jersey City, N. J., and a 5,000,000 cu.ft. storage holder at New Durham.

The compressor house will be a one-story brick structure, 72 feet long by 33 feet wide, and will contain three large steam-driven centrifugal compressors. Each machine will pump 2,500,000 cu.ft. of gas per hour. These three new compressors will replace the present pumping equipment at West End, consisting of six rotary type "pushers" which, night and day, for the last twenty-two years, have kept an uninterrupted supply of gas flowing to homes and industries in Hudson and Bergen Counties.

The gas storage holder will be of a type that differs from the old style of holder in that it consists of a rigid polygon frame instead of a series of telescopic cylinders. In addition to the new holder, three electric-driven centrifugal gas compressors will be installed at New Durham to replace the present pumping system consisting of three gas compressors driven by gas engines.

The West End work and the installation at New Durham are being done by United Engineers and Constructors, Inc. The holder is being erected by the Bartlett Hayward Company.

Sir Francis Goodenough to End Long Service

Sir Francis Goodenough, C.B.E., who for twenty-eight years has been controller of the Gas Sales Department of The Gas Light and Coke Company of London and has been with the company more than forty-three years, has announced his early retirement from the service of that company.

It is stated, however, that Sir Francis will continue and perhaps increase his activity in the capacity of executive chairman of the British Commercial Gas Association.

Natural Gas Department

H. C. COOPER, Chairman E. J. STEPHANY, Secretary H. L. MONTGOMERY, Vice-Chairman

Supplement to the Bibliography* on Change-Overs from Manufactured to Natural Gas

By LUIS HILT,

Librarian, American Gas Association

"NATURAL" Comes to Utah—and Finds Gas Men Ready; J. D. Roberts, *Western Gas*, Oct., 1929: 38-40 & 60.

Preliminary Report of Subcommittee on the Study of Factors Involved in the Change-Over from Manufactured to Natural Gas; W. D. Burk, *American Gas Association Proceedings*, 1929: 822-33.

Facts Relating to the Production and Substitution of Manufactured Gas for Natural Gas; W. W. Odell, *U. S. Bureau of Mines Bulletin*, 301: 1929.

Changing from Manufactured to Natural Gas; W. A. Dunkley, *Gas Age*, 65: 927-8, 933, June 21, 1930.

Preparing a 101,000 Meter District for Natural Gas Service; Elliott Taylor, *Western Gas*, Aug., 1930: 23-5, 52.

Effect upon Service and Economy When Changing from Manufactured to Natural Gas; G. Wehrle, *American Gas Journal*, Oct., 1930: 54-6.

Study of Factors Involved in the Change-Over from Manufactured to Natural Gas; W. D. Burk, *American Gas Association Committee Report*, 1930.

Developing Natural Gas Sales; R. E. Fisher, *American Gas Association Proceedings*, 1930: 339.

How Change-Over from Manufactured to Natural Gas Has Affected Company Advertising and Publicity; F. R. Jamison, *American Gas Association Proceedings*, 1930: 716.

Substitution of Natural Gas for Manufactured Gas in Public Utility Operations; G. Wehrle, *American Gas Association Proceedings*, 1930: 742. Same: *Gas Age*, 66: 675-80, Oct. 25, 1930; *Natural Gas*, Dec., 1930: 22-5; *Oil & Gas Journal*, Oct. 30, 1930: 78.

Industrial Sales and Service Problems Encountered in Change-Over from Manufactured to Natural Gas; J. H. Gumz, *American Gas Association Proceedings*, 1930: 597. Same: *Gas Age*, 66: 763-8, Nov. 8, 1930; *Natural Gas*, Dec., 1930: 10-3, 72.

President Hoover Turns on Natural Gas in Washington, D. C.; *American Gas Association Monthly*, March, 1931: 99-100.

Trying problem; effects of change-over to natural gas on the manufacturing plant and its personnel; *American Gas Journal*, March, 1931: 42-4.

Changing Over Consumers Equipment to Natural Gas; F. J. Gunther, *Natural Gas*, March, 1931: 54-6, 62-3.

Organization and Management at Atlanta Gas Light Company; R. C. Hoffman, Jr., *Gas Age*, 67: 446-50, 467-8, March 28, 1931.

Publicity and Advertising at Atlanta Gas Light Company; Legare Davis, *Gas Age*, 67: 451-3, 468, March 28, 1931.

Plan of Distribution at Atlanta Gas Light Company; E. C. Kollock, *Gas Age*, 67: 454-7, 471, March 28, 1931.

Conditioning Natural Gas; *Gas Age*, 67: 457-60, 471-2, March 28, 1931.

Converting Appliances; *Gas Age*, 67: 460-1, 472, 479, March 28, 1931.

Merchandising Methods at Atlanta Gas Light Company; A. C. Crandall, *Gas Age*, 67: 462-3, 479-80, March 28, 1931.

Industrial Sales at Atlanta Gas Light Company; E. P. Kramer, *Gas Age*, 67: 464-7, March 28, 1931.

Saturation Control for the Rehydration of Natural Gas; W. C. Begeebing, *Gas Age*, 67: 501-4, April 4, 1931.

Natural gas distribution and its problems; E. C. Kollock, Mid-West Gas Association Convention paper, April 13-15, 1931.

Changing over customer equipment to natural gas; F. J. Gunther, Mid-West Gas Association Convention paper, April 13-15, 1931.

Telling the customer the story of "change-over" to natural gas; Paul Renshaw, American Gas Association Accounting Conference paper, April 23-4, 1931.

Memphis records progress as a natural gas city; Wm. A. Dunkley, *Gas Age*, 67: 610-1 & 646, April 25, 1931.

Design of gas distribution system; discussion of underlying principles in conversion to natural gas in Denver area; C. A. Harrison, American Gas Association Distribution Conference paper. *Gas Age*, 67:583-6, April 18, 1931. Same: *Oil & Gas Jrl.*, May 7, 1931: 116 & 118.

Effect of change-over to natural gas; G. Wehrle, American Gas Association Distribution Conference paper. *Oil & Gas Jrl.*, May 7, 1931:155-6.

Home service cooperates in changing over to natural gas; Ruth Menoher, *Gas Age* 67:716-26, May 9, 1931.

* This appeared on page 324 of the "A. G. A. Monthly" for July, 1930.

Engineers to Study Russian Market

DURING the summer of 1930 Dr. Henry R. Seager, of the faculty of Political Science of Columbia University, and a group of economists and business men went to Russia to make a study of the Soviet Five Year Plan of the possibilities for future Soviet-United States trade. Those who made this trip were unanimous in the opinion that the Russian market is rich with opportunities which are to be had for the asking. Dr. Seager made arrangements with Soviet officials to interview American business men who might visit Russia during the summer of 1931 and discuss these opportunities with them. Roy H. Mackay, economist and authority on Soviet affairs, is carrying out these arrangements and extends an invitation to American manufacturers, engineers and economists to visit Russia during the coming summer and make a conservative study of the Russian market.

A program of thirty days, from Berlin back to Berlin, has been arranged. For the convenience of those who wish to make the trip the party will be divided into two groups, the first to leave Berlin on July 15 and the second on July 25.

Conferences will be held with Soviet officials and American engineers and builders in the principal industrial centers. The Soviet officials are eager to discuss the opportunities available. Representatives of the Soviet government and American economists who have made a thorough study of Soviet economy will accompany both groups so that the situation may be understood from all viewpoints.

Business men, economists, engineers and builders who are interested in joining one of these groups should communicate with Roy H. Mackay, Fayerweather Hall, Columbia University, New York City.

Street Lights For Oklahoma Town

Citizens of Arcadia, Okla., have subscribed a fund for installation of gas lights on the streets of that community. Arcadia is an unincorporated community and therefore any improvements must be financed through subscriptions.

Manufacturers' Section

E. S. DICKEY, Chairman C. W. BERGHORN, Secretary DAVID F. KAHN, Vice-Chairman W. E. STEINWEDELL, Vice-Chairman

New Members Join Association

SINCE the publication and mailing of Vol. 2 of the American Gas Association's Year Book, the following manufacturer companies, with their official delegates, have become members of the Association:

Irwin Gas Combustion Company, Leroy J. Clark, secretary, 20 North Wacker Drive, Chicago, Illinois. Gas-fired boilers, and warm air furnaces.

The North American Manufacturing Company, George Reuben Brown, President and treasurer, 2910 East 75th Street, Cleveland, Ohio. Turbo blowers; proportioning mixers; combustion equipment.

H. M. Sheer Company, R. T. Williams, vice-president, Second and Hampshire Street, Quincy, Illinois. Motor gas valves; thermostatic control equipment for house heating plants; thermostatic controls for space heaters.

Williams Radiator Company, J. M. Williams, president, 1865 Cordova Street, Los Angeles, California. Gas steam radiators.

Special Services

The following publications have been published of especial interest to manufacturer members:

Issue No. 8 of "News Items Relating to Extension of Gas Service," which includes information on new communities supplied with gas; franchises granted; changes in gas company ownership, and similar information for period March 15 to April 15.

List of manufactured gas companies in the United States and Canada having special rates for house heating.

List of manufactured gas companies in the United States and Canada having special rates for water heating.

These latter lists were compiled from the Association's Rate List No. 9. Copies of the above publications were mailed to all manufacturer company members, and there is on hand a limited supply for those who may desire additional copies.

As previously announced, the Association's Rate List No. 9, including manufactured, natural, and butane gas rates in effect in the United States, its possessions, Canada and Newfoundland, as of January 1, 1931, is now ready. One copy of this publication is available for each manufacturer company member and additional copies may be purchased at $5 each.

Classified Directory

The attention of manufacturer members is invited to the publication this year of the Classified Directory in the Association's Year Book, Vol. 2. The secretary would be glad to have any additions and changes which members desire in future publications of this directory.

Annual Exhibition

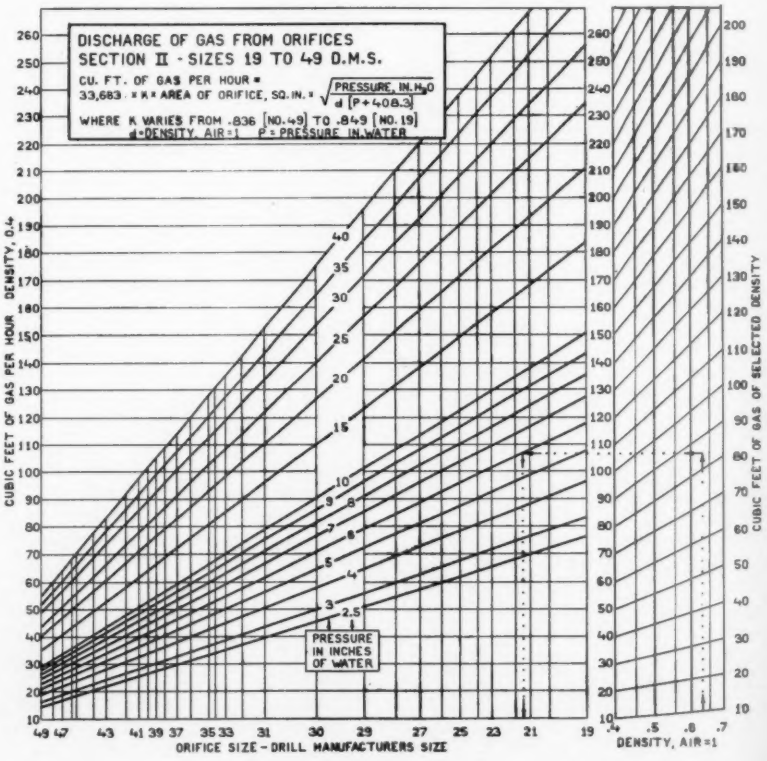
A list of exhibitors at the Thirteenth Annual Convention and Exhibition was published in the May issue of The Monthly. We are daily receiving additional applications, and since the May publication the following companies have been allotted space:

	Booth No.
Allen Manufacturing Company	717
Andes Range & Furnace Corp.	709
Forest City Foundries Company	119
Gas-Aire, Inc.	712
Hones Co., Chas. A.	715
Hubbard Oven & Manufacturing Co., Inc.	834
Natural Gas Magazine	628
Sheer Company, H. M.	733

Further Notes on "Combustion"

THE chart illustrated below is one of a series of three covering drill sizes from D.M.S. No. M to D.M.S. No. 60 which have been prepared as part of the new Combustion book. These charts are separately available, however, in large blueprints, measuring 15 inches square, suitable for framing as wall charts. The price of these separate blueprints is 25 cents each, or 75 cents for a set of the three charts.

The following example will illustrate the procedure in using the charts: Suppose it is desired to know how large an orifice is needed to discharge 85 cu.ft. of 0.63 gravity gas per hour. From the right-hand side of the chart estimate between 0.6 and 0.7 gravity, in the position 0.63. Project upward until a position midway between the diagonal lines 80 and 90 cu.ft. of gas per hour is reached. From this point, project horizontally to the left until the curve corresponding to the desired gas pressure is intersected. Then on the scale below the drill sizes will be found.


DISCHARGE OF GAS FROM ORIFICES
SECTION II - SIZES 19 TO 49 D.M.S.
CU. FT. OF GAS PER HOUR = 33,683 × K × AREA OF ORIFICE, SQ. IN. × √(PRESSURE, IN. H2O / d [P + 408.3])
WHERE K VARIES FROM .836 [NO. 49] TO .849 [NO. 19]
d = DENSITY, AIR = 1 P = PRESSURE IN WATER
CUBIC FEET OF GAS PER HOUR DENSITY, 0.4
CUBIC FEET OF GAS OF SELECTED DENSITY
PRESSURE IN INCHES OF WATER
40
35
30
25
20
15
10
9
8
7
6
5
4
3
2.5
49 47 43 41 39 37 35 33 31 30 29 27 25 23 21 19
ORIFICE SIZE - DRILL MANUFACTURERS SIZE
.4 .5 .6 .7
DENSITY, AIR = 1

Gas Appliance and Equipment Developments

Sales Portfolio

A visual sales presentation is a part of the sales promotion material prepared by The W. E. Lamneck Co., Columbus, Ohio, manufacturers of the Lamneck Dryer. This portfolio, designed for use by salesmen, represents a selling tool in dealing with various types of prospects.

For New Business Managers

The Reznor Manufacturing Company, Mercer, Pa., has available for supply to gas company new business managers, two standard pages for the A. G. A. salesmen's handbook and covering essential information on the Reznor Gas-Fired Warm Air Heating and Ventilating Unit, type 1-U.R.

Changes Corporate Name

The Welsbach Water Heater Company of New England has changed its name to Gas Equipment Corporation, 113 Purchase Street, Boston, Mass.

New Line of Ranges

A catalog illustrating a new line of ranges may be had by writing to the Chambers Manufacturing Company, Shelbyville, Indiana.

Butane Plant To Be Installed at Catskill, New York

The Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y., has contracted with the Propane-Butane Contracting Corporation, Baltimore, Md., for consulting engineering service covering a Butane air-gas dilution plant of the most modern type to be installed at Catskill, N. Y. The plant will use the Kemp Air-Gas Carburetion Equipment.

Bailey Joins National Radiator

Announcement was made last month by John H. Waters, president of the National Radiator Corporation, of Johnstown, Pa., that Edward P. Bailey, Jr., of Cleveland, consultant in the gas-heating field and former president of the Bryant Heater and Manufacturing Company, has become identified with the corporation, as general manager of the newly-established gas heating division.

Appointed Chief Engineer

The North American Manufacturing Co., Cleveland, Ohio, announces the appointment of Otto Lutherer as chief engineer. Mr. Lutherer is an engineer graduate of the University of Berlin and has spent a year in the laboratories of the Bureau of Standards at Washington and for the past four and one-half years being research engineer at the laboratory of the American Gas Association.

Contributions by manufacturers of gas appliances and equipment to this department will be welcomed by The A. G. A. Monthly. On account of space limitations, all announcements of new products, improvements, etc., should be limited to about 100 words. No attempt will be made to describe each product or give details of construction. For such details address the manufacturer direct. Where justified, photographs will be used to illustrate these brief items. All contributions to this department should be addressed to C. W. Berghorn, Secretary, Manufacturer's Section, American Gas Association, 420 Lexington Ave., New York, N. Y.

Breathing Apparatus Approved

The Mine Safety Appliances Company, Pittsburgh, Pa., announces that the McCaa one-half hour self-contained oxygen breathing apparatus has been officially approved by the United States Bureau of Mines for safety, practicability and efficiency in general service. The McCaa one-half hour apparatus furnishes respiratory protection in oxygen deficient and highly concentrated gaseous atmospheres and is the only half-hour apparatus ever approved by the Bureau.

Issues Booklet

The Connelly Iron Sponge & Governor Co., Elizabeth, N. J., has issued a new booklet, "Gas Works Apparatus and Equipment," copies of which will be mailed on request.

Ruud Sales Bulletin

The Ruud Manufacturing Company, Pittsburgh, Penn., has issued a new sales bulletin entitled "Ruud Automatic Water Heaters for Butane, Propane and Other Liquified Petroleum Gases." It is supplied without charge by the manufacturer.

Gas Branch Connections Under Full Pressure

The A. P. Smith Manufacturing Company, East Orange, N. J., which has been furnishing machines to the waterworks field for tapping water mains for branch connections, using special sleeves of its manufacture, for forty years, recently put into the field a special form of its tapping machine as well as special forms of tapping sleeves for making branch connections to gas mains under full pressures.

Duplex Car Unloader

A new one-man car unloading unit that will increase coal storage from trestle tracks from 100 per cent to 500 per cent is announced by the Barber-Greene Company, Aurora, Illinois, manufacturers of portable material handling equipment.

Measuring Widely Varying Loads

The Foxboro Company, Foxboro, Mass., announces a Differential Limit Controller which automatically cuts in a secondary meter when the load exceeds that which may be handled by the primary meter. When the load decreases below that which may be accurately handled by the two meters in parallel, it functions to cut out the secondary meter. It may be used either in connection with a positive meter in the primary hook-up with an orifice meter to handle the excess load, or in connection with any number of orifice meters in a parallel setting.

Bakelite Range Handles

The Imperial Brass Manufacturing Co., 1200 West Harrison Street, Chicago, Ill., is making a Bakelite pendant door handle for ranges and in position to furnish gas cock handles to match. The pendant drop is made of Bakelite and the bracket and link of metal, nickel plated.

Chambers Publishes Booklet

"The Moderne Woman Chooses an Automatic Gas Range" is the title of a booklet recently printed by the Chambers Manufacturing Company, Shelbyville, Indiana. A copy of the booklet will be sent on request.

A. G. A. Adopts New Five-Year Program

(Continued from page 243)

"That the statistical work of the Association be limited to the practical needs of the industry.

"That the declaration of the Program of 1926 be repeated, that the Association should pay for its various undertakings, out of its resources, secured through dues or other direct subscriptions to its treasury, in preference to special assessments.

"That there be continued adherence to the policy that the Association shall not extend its work beyond those objects which are of first importance and greatest practical value to the industry it being obvious that if its activities become broadened beyond the scope of practical accomplishment, its influence will inevitably be weakened."

Monthly Summary of Gas Company Statistics

FOR MONTH OF MARCH, 1931

Issued May, 1931, by the Statistical Department of the American Gas Association
420 Lexington Avenue, New York, N. Y.

PAUL RYAN, Statistician

REVENUES of manufactured and natural gas utilities aggregated $195,496,393 during the first quarter of 1931 as compared with $203,576,209 for the first quarter of 1930, a decline of 4 per cent, according to reports to the Statistical Department of the American Gas Association from companies serving 13,616,227 customers and representing nearly 90 per cent of the public utility distribution of manufactured and natural gas.

The manufactured gas companies reported revenues of $101,674,793 for the quarter, a drop of nearly 2 per cent from a year ago, while revenues of natural gas concerns totalled $93,821,600, or about 6 per cent less those for the first quarter of 1930.

Sales of manufactured gas reported for the quarter totalled 97,385,297,000 cu.ft., a decline of 1.3 per cent, while natural gas utility sales for the quarter were 210,057,801,000 cu.ft., a drop of nearly 11 per cent.

Most of the decline in both manufactured and natural gas sales was the result, in large part of the marked contraction in general economic and industrial conditions characterizing the first quarter of the current year, so that the more pronounced curtailment in natural gas sales was due to the larger proportion of industrial gas business handled by these companies.

New England was one of the few sections of the country where results ran counter to the general trend, this section showing an increase of 22 per cent in house heating sales and a gain of 4.3 per cent in total gas sales. The results in Massachusetts were particularly noteworthy, with a gain of 22 per cent in house heating sales, 3 per cent in industrial sales and an increase of nearly 5 per cent in total gas sales for the quarter.

COMPARATIVE STATISTICS OF 165 MANUFACTURED GAS COMPANIES FOR THE MONTH OF MARCH, 1931

	Month of March			*Three Months Ending March 31*		
	1931	*1930*	*Per cent Increase*	*1931*	*1930*	*Per cent Increase*
Customers	9,004,058	8,993,236	0.1	*See March*		
Gas Sales (MCF)	31,432,478	31,685,513	— 0.8	97,385,297	98,637,810	— 1.3
Revenue (Dollars)	32,863,003	33,309,759	— 1.3	101,674,793	103,415,753	— 1.7
Gas Produced and Purchased (MCF)						
Gas Produced						
(a) Water Gas	16,929,194	17,632,950	— 4.0	50,702,646	53,155,560	— 4.6
(b) Retort Coal Gas	2,700,518	2,887,316	— 6.5	8,475,691	8,394,289	1.0
(c) Oil Gas	675,499	720,361	— 6.2	2,302,038	2,539,587	— 9.3
(d) Coke Oven Gas	4,676,078	4,076,070	14.7	12,965,735	12,179,530	6.4
(e) Reformed Oil Still Gas	410,044	168,422	—	1,117,935	493,667	—
(f) Total Gas Produced	25,391,333	25,485,119	— 0.4	75,564,045	76,762,633	— 1.4
Gas Purchased						
(a) Coke Oven Gas	9,450,981	9,692,954	— 2.5	28,321,022	28,634,644	— 1.1
(b) Natural Gas	420,406	316,144	33.0	970,289	925,678	4.8
(c) Total Gas Purchased	9,871,387	10,009,098	— 1.4	29,291,311	29,560,322	— 0.9
Total Gas Produced and Purchased	35,262,720	35,494,217	— 0.6	104,855,356	106,322,955	— 1.4

COMPARATIVE STATISTICS OF 158 NATURAL GAS COMPANIES FOR THE MONTH OF MARCH, 1931

Customers						
Domestic (Including House Heating)	4,372,838	4,331,324	1.0			
Commercial	216,590	200,951	7.8			
Industrial	15,643	15,347	1.9	*See March*		
Main Line Industrial	4,650	3,972	17.1			
Miscellaneous	2,448	1,854	—			
Total	4,612,169	4,553,448	1.3			
Gas Sales (MCF)						
Domestic (Including House Heating)	31,437,726	31,254,254	0.6	105,239,065	109,442,943	— 3.8
Commercial	4,761,748	4,239,137	12.3	15,758,287	14,862,512	6.0
Industrial	17,214,750	19,241,269	—10.5	51,509,688	60,161,613	—14.4
Main Line Industrial	12,448,672	19,054,012	—34.7	35,708,744	49,048,686	—27.2
Miscellaneous	907,982	654,699	—	1,842,017	2,276,853	—
Total	66,770,878	74,443,371	—10.3	210,057,801	235,792,607	—10.9
Revenue (Dollars)						
Domestic (Including House Heating)	20,670,868	20,563,008	0.5	68,858,665	70,961,022	— 3.0
Commercial	2,301,936	2,151,565	7.0	7,555,805	7,319,407	3.2
Industrial	4,114,122	4,926,131	—16.5	12,337,205	15,126,914	—18.4
Main Line Industrial	1,696,995	2,325,435	—27.0	4,717,681	6,219,165	—24.1
Miscellaneous	120,619	146,682	—	352,244	533,948	—
Total	28,904,540	30,112,821	— 4.0	93,821,600	100,160,456	— 6.3

Associations Affiliated with A. G. A.

Canadian Gas Association

Pres.—A. T. Leavitt, Hamilton By-Product Coke Ovens, Ltd., Hamilton, Ont.
Sec.-Tr.—G. W. Allen, 21 Astley Avenue, Toronto.

Empire State Gas and Electric Association

Pres.—William J. Welsh, New York & Richmond Gas Co., Staten Island, New York.
Chairman Gas Section—M. F. Clement, Rockland Light & Power Co., Middletown, Ind.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.

Illinois Gas Association

Pres.—H. A. Kleinman, Peoples Power Co., Moline, Ill.
Sec.-Tr.—George Schwaner, 305 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Gas Association

Pres.—T. L. Kemp, Indiana Consumers Gas & By-Products Co., Terre Haute, Ind.
Sec.-Tr.—P. A. McLeod, Northern Indiana Power Co., Huntington, Ind.

Michigan Gas Association

Pres.—Prof. A. H. White, University of Michigan, Ann Arbor, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.

Maryland Utilities Association

Pres.—Adrian Hughes, Jr., Baltimore, Md.
Sec.—D. E. Kinnear, 803 Court Square Bldg., Baltimore, Md.

Mid-West Gas Association

Pres.—John K. Swanson, Minneapolis Gas Light Co., Minneapolis, Minn.
Sec.-Tr.—Roy B. Searing, Sioux City Gas & Electric Co., Sioux City, Iowa.

Missouri Association of Public Utilities

Pres.—A. E. Bettis, Kansas City Power and Light Co., Kansas City, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Asst. Sec.—Jesse Blythe, 103 West High St., Jefferson City, Mo.

New England Gas Association

Pres.—M. B. Webber, Arlington Gas Light Co., Arlington, Mass.
Exec. Sec.—C. D. Williams, 41 Mount Vernon St., Boston, Mass.
Chairman Operating Div.—F. M. Goodwin, Boston Consolidated Gas Co., Boston, Mass.
Sec. Operating Div.—P. R. Buchanan, Hartford Gas Company, Hartford, Conn.
Chairman Sales Div.—J. J. McKearin, Lowell Gas Light Co., Lowell, Mass.
Sec.-Tr. Sales Div.—Robert D. Stuart, Jr., Fall River Gas Works Co., Fall River, Mass.
Chairman Industrial Div.—Chas. H. O'Donnell, Boston Consolidated Gas Co., Boston, Mass.
Sec.-Tr. Industrial Div.—Phillip A. Nelles, Jr., C. H. Tenney Co., Boston, Mass.
Chairman Acctg. Div.—C. N. Alexander, C. H. Tenney & Co., Boston, Mass.
Sec.-Tr. Acctg. Div.—Otto Price, Boston, Mass.
Chairman Manufacturer Div.—A. M. Slattery, The Hoffman Heater Co., Boston, Mass.
Sec.-Tr. Manufacturers Div.—J. H. McPherson, Clow Gasteam Heating Co., Boston, Mass.

New Jersey Gas Association

Pres.—Louis Stoecker, Public Service Electric & Gas Co., Newark, N. J.
Sec.-Tr.—H. E. Cliff, Public Service Electric & Gas Co., Newark, N. J.

Ohio Gas and Oil Men's Association

Pres.—L. K. Langdon, Union Gas & Electric Co., Cincinnati, Ohio.
Sec.-Tr.—Wm. H. Thompson, 811 First National Bank Bldg., Columbus, Ohio.

Oklahoma Utilities Association

Pres.—S. I. McElhoes, Southwestern Light & Power Co., Oklahoma City, Okla.
Mgr.—E. F. McKay, 1020 Petroleum Bldg., Oklahoma City, Okla.

Pacific Coast Gas Association

Pres.—R. E. Fisher, Pacific Gas & Electric Co., San Francisco, Calif.
Mang. Dir.—Clifford Johnstone, 447 Sutter St., San Francisco, Calif.

Pennsylvania Gas Association

Pres.—H. Smyser Bair, Pennsylvania Gas & Electric Co., York, Pa.
Sec.-Tr.—Frank W. Lesley, Pennsylvania Gas & Electric Co., York, Pa.

Pennsylvania Natural Gas Men's Association

Pres.—George E. Welker, United Natural Gas Co., Oil City, Pa.
Sec.-Tr.—B. H. Smyers, Jr., 435 Sixth Ave., Pittsburgh, Pa.

Southern Gas Association

Pres.—A. J. Goss, Chattanooga Gas Co., Chattanooga, Tenn.
Sec.-Tr.—G. H. Schlatter, Birmingham Gas Co., Birmingham, Ala.

Southwestern Public Service Association

Pres.—Knox Lee, Southwestern Gas & Electric Co., Marshall, Texas.
Chairman Gas Section—Frank L. Chase, Lone Star Gas Co., Dallas, Texas.
Sec.—E. N. Willis, c/o University Club, Dallas, Texas.

The Public Utilities Association of Virginia

Pres.—T. Justin Moore, Va. Elec. & Power Co., Richmond, Va.

Wisconsin Utilities Association

Pres.—A. J. Goedjen, Wisconsin Public Service Corp., Green Bay, Wis.
Exec. Sec.—J. N. Cadby, 135 West Wells St., Milwaukee, Wis.

Thirteenth Annual Convention of the American Gas Association
Atlantic City, N. J. - - - October 12-16, 1931

Personnel Service

SERVICES OFFERED

Executive of proven ability with 17 years' experience in all phases of natural gas business desires position in executive capacity with property in stages of construction or in operation. Can give satisfactory references. **399.**

Superintendent with 23 years' practical experience in the production and distribution of manufactured gas desires position with managerial responsibility in small property. **401.**

Engineer (33) college graduate. Thirteen years' experience in combustion engineering, both industrial and house heating line. Worked on the development, design, laboratory testing and installation and service of two of the leading Gas Conversion Burners for house heating. Desires position with manufacturing company or gas company. Location around Cleveland preferred, but will consider other locations. **402.**

Superintendent of large gas plant or operating manager of a group of small plants. Experienced in high- and low-pressure systems. Excellent record in operation and construction. Available at once. **405.**

Natural gas **executive** with twelve years' experience in the design, construction and operation of high-pressure transmission lines, compressor stations and town distribution plants. **406.**

Manager-engineer (37) married; thoroughly trained with eight years' practical experience in coal, water, natural, refinery oil still and butane gas, mixing, production, distribution and utilization, high and low pressure. Just finished design and construction of three small plants and distribution systems. Prefer Engineering Department of large utility or District Manager. **407.**

Thermal Engineer (M.S.). Long training and experience with industrial gas applications. Familiar with natural and the various manufactured gases and their practical ratings. Desirable expert advisor to industrial gas sales division, and as organizer and director of fuel economics for heavy industrial consumers. Recognized authority on Combustion. Familiar with utility problems affecting sales conditions. Able to promote and direct practical testing and development to extend the use of gas, especially as chemical manufacturing material. **408.**

Salesman—experienced in sales promotion of all gas appliances including gas house heating and distribution department of gas business; desires position with good opportunity for advancement. Capable of taking charge of sales or distribution department, small company preferred. Will go anywhere. Married. Age 35. **409.**

Position of responsibility desired by experienced public utility **executive.** Possessed of diplomacy and ability in meeting the public. Good education, appearance, personality and business judgment. **410.**

Gas engineer, now employed, desires change. Twelve years with large gas apparatus construction company. Experienced in designing, estimating and operating all sizes and types of gas plant equipment. **411.**

Superintendent or Assistant (36) with sixteen years' experience in operation, maintenance and manufacture of water and coal gas plants. Understand high- and low-pressure distribution. Not afraid of hard work, can obtain results. Applicant willing to go anywhere his training and experience can be of use. **412.**

Young practical **engineer,** eight years' experience in installation, maintenance and laboratory testing of all types of gas appliances; would like connection with manufacturer or gas company in New England or upper New York State. **413.**

Salesman having had several years' experience in selling general line of gas equipment. **414.**

Superintendent of small, or **general foreman** of large plant; twenty years' broad experience with various companies in manufacturing and construction. **415.**

SERVICES OFFERED

Househeating sales engineer would like to make connection with a utility company, or manufacturer. Eight years' experience selling. Have sold gas ranges, water heaters, specialized on gas heating equipment. **417.**

Gas engineer desires position as assistant to an executive of a public utility or of a manufacturing company. College education; six years' utility experience; prefers Eastern location. Knows industrial and house heating sales, development of new markets, rate and franchise matters, and public relations. **418.**

Sales engineer, eighteen years' experience in utility sales department activities and management. Graduate engineer. Desires permanent position with utility or manufacturer. **419.**

Superintendent of measurement and distribution of natural gas desires new connection. Twelve years' experience in all branches of the gas industry, including production, transportation, measurement and distribution, both industrial and domestic. Graduate Mechanical Engineer. Employed at present. Age 39. Married. **421.**

Experienced, practical gas manager, at present general manager of small properties, desires position as **assistant manager** or **district manager** of medium sized property. Nineteen years' experience water gas, and coal gas, high and low pressure, sales, rate procedure and public relations. Capable, energetic, conscientious executive. Prefer New England or Eastern location. **422.**

Manager with twelve years' experience in all phases of natural gas business desires position as manager of small plant or assistant to manager of large plant. **423.**

Commercial manager with a record in the electric as well as the gas industry wishes a new connection in which to demonstrate his sales ability. Broad experience and a record of accomplishment in the appliance manufacturing as well as the utility field. Versed in sales research, budget control, surveys, reports, etc. Also publicity and gas engineering. Now located in the east. **425.**

Trade Relations and Sales Promoter (34), six successful years organizing and managing plumbing, heating, electrical and other construction groups, can procure the goodwill and active cooperation of these groups for cooperative utility appliance merchandising program. Also nine years' newspaper, advertising, trade publication, credit, sales, public speaking, and executive experience. Married. **426.**

Factory representative, metropolitan area, (New York, New Jersey and Connecticut) with long executive and sales experience and an established following in domestic appliances, particularly heating. Has entree to trade and public utilities. With office, warehouse and transportation facilities available under one roof, will contract to represent one line exclusively or not more than three non-conflicting on cooperative plan basis. **427.**

Manager, University Graduate (M.E.) with five years' experience in production, distribution and industrial engineering; qualified to manage property 5000 to 10,000 meters. **428.**

Chemist, experienced in the preparation of reports, cost estimates, market surveys and in patent and literature searches. University graduate, M.S. (33); ten years' research experience in gas and oil fields. **429.**

Engineer-Manager with technical education and eighteen years of service in all branches of the gas industry, both manufactured and natural, including public utilities commissions, desires position with considerable responsibility requiring executive ability, technical training and practical experience. **430.**

POSITIONS OPEN

Leading manufacturer wants **gas range construction engineer** with expert manufacturing knowledge on pressed steel and grey iron construction. Must have successful record and experience with ability to take complete charge. Wonderful opportunity for the man who qualifies. State salary earned in the past and give complete detailed information as to experience. **0207.**

Manufacturer's Representatives to handle well-known line of Circulating Cabinet Heater. Have interesting proposition for representatives who have had experience in handling this type of equipment. **0211.**

Stove Merchandising Men: If you are a live, aggressive, high-grade man familiar with public utility requirements and seek an opportunity of associating yourself with a leading manufacturer offering the best stove values in the industry, state your qualifications and communicate with **0214.**

Advertising copy man, account executive, who knows advertising and merchandising of gas appliances especially house heating boilers or furnaces, with agency having account of manufacturer just entering this field. Please give complete outline of experience and state salary expected. **0215.**

Engineer to lay out and conduct research work on industrial gas applications. Location Ohio. Must be technical graduate with several years' experience in industrial department of gas company. Age preferably 30 to 35. Good opportunity for advancement. State age, experience in detail, and salary expected. **0216.**

ANSWERING ADVERTISEMENTS

Advertisements under "Positions Open" condense into available space major requirements of education, training and experience; A. G. A. Personnel Service also may have furnished a list of suitable individuals from classified confidential records.

Consequently advertisers of "Positions Open" receive many communications and when preparing a "short list," or making a final selection, the letter of application constitutes the only spokesman for the individual out of a large number of qualified personnel.

Attention is invited to a few of the apparently minor, but actually very important, considerations often overlooked in applying for advertised vacancies. First are neatness, conciseness and accuracy, and use of the typewriter is essential; next is furnishing full details of all the information requested by the advertisement and another is that only advertisements in the current issue of the MONTHLY should be acknowledged.

The market for selling personal service is strongly competitive and all of the legitimate sales methods may be necessary.

Advisory Council

D. D. BARNUM ..... Boston, Mass.
H. E. BATES ..... Chicago, Ill.
T. R. BEAL ..... Poughkeepsie, N. Y.
J. M. BENNETT ..... Philadelphia, Pa.
R. B. BROWN ..... Milwaukee, Wis.
HOWARD BRUCE ..... Baltimore, Md.
J. J. BURNS ..... St. Louis, Mo.
*H. C. CLARK ..... Newark, N. J.
C. M. COHN ..... Baltimore, Md.
J. L. CONOVER ..... Newark, N. J.
GEO. B. CORTELYOU ..... New York, N. Y.
F. G. CURFMAN ..... New York, N. Y.
P. H. GADSDEN ..... Philadelphia, Pa.
E. FRANK GARDINER ..... Chicago, Ill.
R. C. HOFFMAN, JR. ..... Atlanta, Ga.
G. M. KARSHNER ..... Brooklyn, N. Y.
J. B. KLUMPP ..... Philadelphia, Pa.
C. C. KRAUSSE ..... Baltimore, Md.
R. M. LEACH ..... Taunton, Mass.
J. P. LEINROTH ..... Newark, N. J.
H. O. LOEBELL ..... New York, N. Y.
F. C. MACKEY ..... Chicago, Ill.
T. N. MCCARTER ..... Newark, N. J.
S. W. MEALS ..... Pittsburgh, Pa.
H. C. MORRIS ..... Dallas, Texas
C. A. MUNROE ..... Chicago, Ill.
GEO. W. PARKER ..... St. Louis, Mo.
F. H. PATTERSON ..... Rochester, N. Y.
F. H. PAYNE ..... Erie, Pa.
B. V. PFEIFFER ..... Philadelphia, Pa.
EDWARD PORTER ..... Philadelphia, Pa.
C. R. PRICHARD ..... Lynn, Mass.
H. S. SCHUTT ..... Philadelphia, Pa.
W. E. STEINWEDELL ..... Cleveland, Ohio
A. L. TOSSELL ..... Chicago, Ill.
H. LEIGH WHITELAW ..... New York, N. Y.
GEORGE E. WHITWELL ..... Philadelphia, Pa.

*Deceased.

AMERICAN GAS ASSOCIATION, INC.

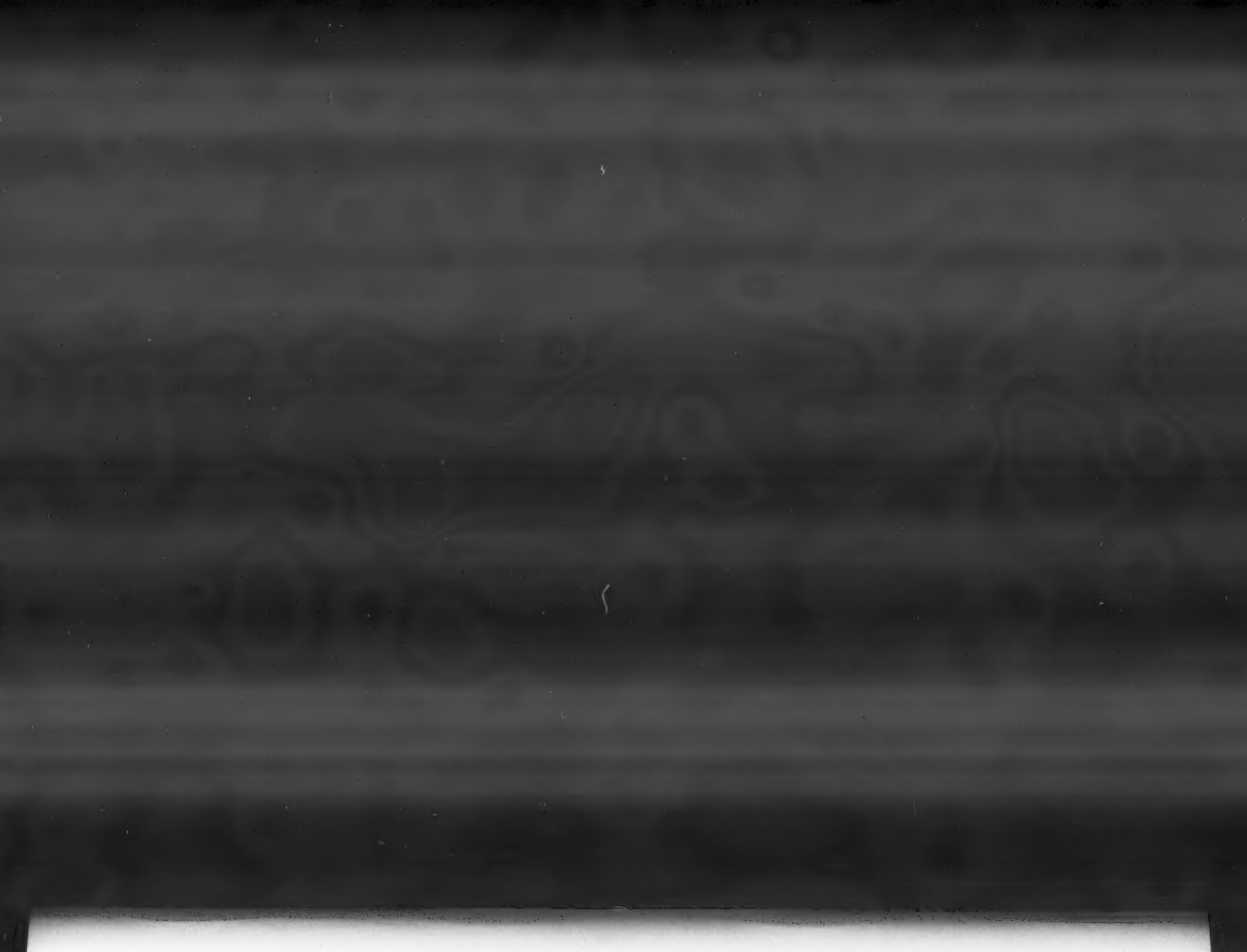
HEADQUARTERS, 420 LEXINGTON AVE., NEW YORK, N. Y.

Officers and Directors

President	C. E. PAIGE	Brooklyn, N. Y.
Vice-President	R. W. GALLAGHER	Cleveland, Ohio
Vice-President	N. C. McGOWEN	Shreveport, La.
Vice-President	ARTHUR HEWITT	Toronto, Ont.
Treasurer	WILLIAM J. WELSH	Staten Island, N. Y.
Managing Director	ALEXANDER FORWARD	New York, N. Y.
Assistant to Managing Director	L. C. SMITH	New York, N. Y.
Assistant Manager	H. W. HARTMAN	New York, N. Y.
Secretary	K. R. BOYES	New York, N. Y.
Director, Publicity-Advg.	KEITH CLEVENGER	New York, N. Y.
Departmental Vice-Pres.	H. C. COOPER	Pittsburgh, Pa.
Sectional Vice-Pres.	D. M. MACKIE	Jackson, Mich.
Sectional Vice-Pres.	J. I. BLANCHFIELD	Brooklyn, N. Y.
Sectional Vice-Pres.	D. W. CHAPMAN	Chicago, Ill.
Sectional Vice-Pres.	E. S. DICKEY	Baltimore, Md.
Sectional Vice-Pres.	R. G. GRISWOLD	New York, N. Y.
Sectional Vice-Pres.	E. R. ACKER	Poughkeepsie, N. Y.

H. C. ABELL	New Orleans, La.	SAMUEL INSULL, Jr.	Chicago, Ill.
WALTER C. BECKJORD	Boston, Mass.	CONRAD N. LAUER	Philadelphia, Pa.
J. D. CREVELING	New York, N. Y.	F. A. LEMKE	Kalamazoo, Mich.
J. S. DeHART, Jr.	Newark, N. J.	A. B. MACBETH	Los Angeles, Calif.
HENRY L. DOHERTY	New York, N. Y.	FRED A. MILLER	Bradford, Pa.
O. H. FOGG	New York, N. Y.	A. E. PEIRCE	Chicago, Ill.
F. C. FREEMAN	Providence, R. I.	HERMAN RUSSELL	Rochester, N. Y.
F. T. HULSWIT	New York, N. Y.	ARTHUR STOCKSTROM	St. Louis, Mo.
B. J. MULLANEY	Chicago, Ill.	T. R. WEYMOUTH	Newark, N. J.
		P. S. YOUNG	Newark, N. J.

Section and Department Officers

NATURAL GAS—Chairman	H. C. COOPER	Pittsburgh, Pa.
Vice-Chairman	H. L. MONTGOMERY	Bartlesville, Okla.
Secretary	E. J. STEPHANY	Dallas, Texas
ACCOUNTING—Chairman	J. I. BLANCHFIELD	Brooklyn, N. Y.
Vice-Chairman	WILLIAM A. DOERING	Boston, Mass.
Secretary	H. W. HARTMAN	New York, N. Y.
COMMERCIAL—Chairman	E. R. ACKER	Poughkeepsie, N. Y.
Vice-Chairman	SAMUEL INSULL, Jr.	Chicago, Ill.
Secretary	J. W. WEST, Jr.	New York, N. Y.
INDUSTRIAL GAS—Chairman	D. W. CHAPMAN	Chicago, Ill.
Vice-Chairman	A. J. PETERS	New York, N. Y.
Secretary	C. W. BERGHORN	New York, N. Y.
MANUFACTURERS'—Chairman	E. S. DICKEY	Baltimore, Md.
Vice-Chairman	DAVID F. KAHN	Hamilton, Ohio
Vice-Chairman	W. E. STEINWEDELL	Cleveland, Ohio
Secretary	C. W. BERGHORN	New York, N. Y.
PUBLICITY AND ADVERTISING		
Chairman	D. M. MACKIE	Jackson, Mich.
Vice-Chairman	WILLIAM H. HODGE	Chicago, Ill.
Secretary	ALLYN B. TUNIS	New York, N. Y.
TECHNICAL—Chairman	R. G. GRISWOLD	New York, N. Y.
Vice-Chairman	I. K. PECK	Chicago, Ill.
Secretary	H. W. HARTMAN	New York, N. Y.
Asst. Secretary	K. H. CREE	New York, N. Y.

PRINTED IN U. S. A.